

Treatise on Photo-Engraving.

MACHINERY

...The...

Ostrander Seymour
Company.

CHICAGO, U. S. A.

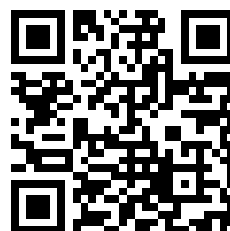
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TREATISE
ON
PHOTO-ENGRAVING
Treatise on Photo-Engraving

....AND....

ILLUSTRATED CATALOGUE

....OF....

Improved Machinery

....AND....

SUPPLIES

MANUFACTURED AND FOR SALE BY

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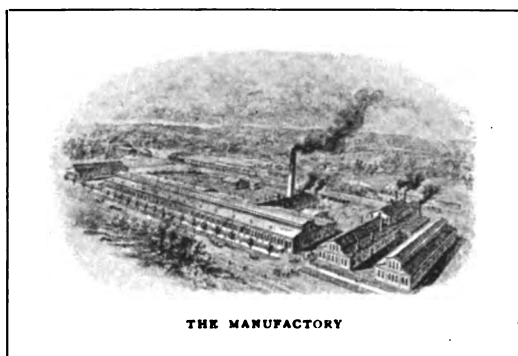
CHICAGO, U. S. A.

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J. O. S.

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THE OSTRANDER-SEYMOUR COMPANY.

Important Introductory

We again make our bow, and in the following pages present a Treatise on Photo-Engraving and our Catalogue illustrating and describing our Improved Machinery.

Business men must elect what class of customers to deal with. We seek that class of purchasers who wish machines built thoroughly well, and which have every part carefully made from the best materials, and who are willing to pay whatever amount may be necessary to obtain such articles. For this reason we give no anxious thought as to whether this or that can be made a little cheaper, but endeavor to have the materials and workmanship just as thoroughly good as possible, the sole criterion being whether the article will be better adapted for its work or more durable in use.

We do not care to sell any machine that is not as good in every respect as though the purchaser himself had selected the materials and personally supervised its construction in our factory.

Our customers are entirely those who use and wear out the machinery they purchase; consequently, quality takes precedence of cost with them. Having no trade with middlemen, there is no temptation to reduce the quality of our machinery to compete with those who seek that class of business.

This Catalogue and Treatise is principally for Photo-Engravers, and those interested in Electrotyping and Stereotyping should send for special catalogues bearing on the subject.

Yours sincerely,

THE OSTRANDER SEYMOUR COMPANY.

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Photo-Engraving.

This Treatise was Prepared Especially for The Ostrander Seymour Company.

HISTORY OF PHOTO-ENGRAVING.

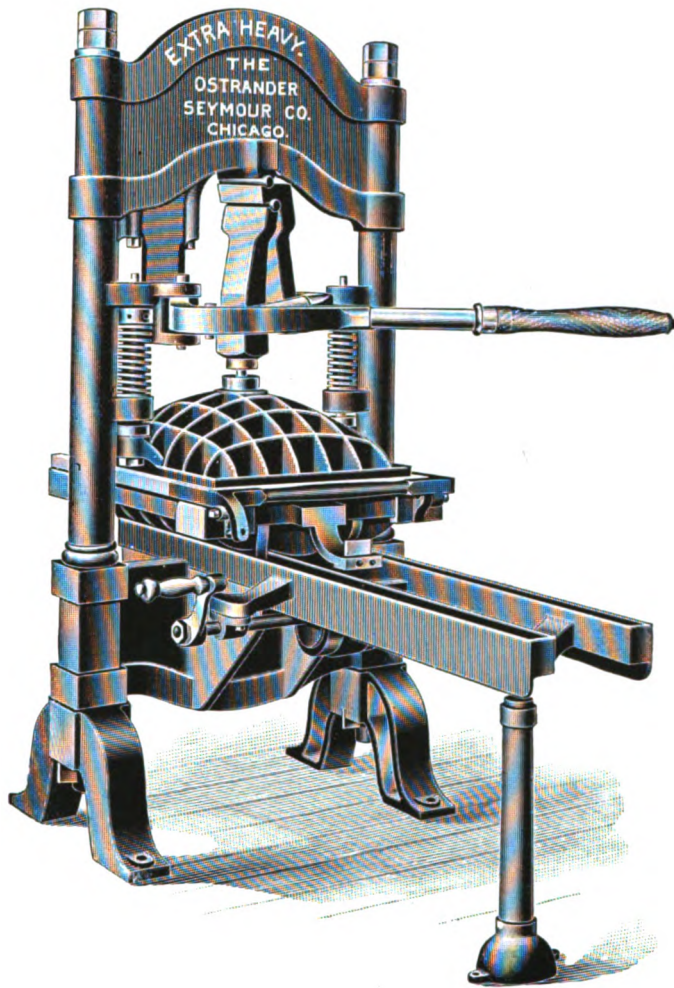
TO the man in the street it sounds like Greek, and even to those whose business connections lead them to handle it, it is a hidden mystery. The most simple form of photo-engraving is undoubtedly like zinc-etching. The writer well remembers when he assisted to work the intricate and costly swelled gelatine process that it would take four to five hours to get a print in dull light and about twenty minutes in the sun, while now it hardly takes that many seconds. All this was succeeded by the simpler wash-cut gelatine method, and that to be superseded by the swift and certain method of zinc-etching.

The first attempt at zinc-etching that is known is attributed to Sir Henry James, who experimented on this line as early as 1859. In those days the design was transferred to the zinc from a photo lithographic transfer and not as now printed from a reversed negative. Then when the line process was proven to be commercially successful, the half-tone process began to work its way forward until now it runs line engraving a close second, in many cases even supplanting it.

Who was the inventor of the half-tone process? The only answer that can be made is that like Topsy in "Uncle Tom's Cabin," "it grewed." The pioneer in this branch of photo-engraving was undoubtedly Baron Frederick von Egloffstein, of the 103rd regiment, New York Volunteers. When it was first mooted abroad that an automatic method of engraving by a photographic process had been discovered it was said that Uncle Sam would take it up to engrave his plates for his money bills, and men prominent (then in the 60's) in national affairs financed it, such men as Salmon P. Chase, Senators Sprague and Morton, Captain Eads and others. With these illustrious gentlemen as shareholders the Heliographic Engraving and Printing Company was started at 135 West 25th street, New York city.

There is another claim to this honor put forth by a M. Berchtold, a Frenchman who took out a patent in France in 1857. But the first man to make it practical and commercially successful was Meisenbach, of Berlin, and for years it was known as the Meisenbach process.

The Ostrander Seymour Co., Chicago, U. S. A.



Extra Heavy Photo-Engravers' Proof Press.

- No. 1—Size of Platen, 15 x 20; Bed 18½ x 23½; weight, boxed, 1,250 lbs.*
No. 2—Size of Platen, 20 x 26; Bed 24 x 30; weight, boxed, 2,500 lbs.
No. 3—Size of Platen, 22 x 30; Bed 26 x 34; weight, boxed, 3,500 lbs.
No. 4—Size of Platen, 24 x 32; Bed 28 x 36; weight, boxed, 4,500 lbs.

The desire of photo-engravers to obtain fine proofs and the trouble usually encountered by the use of presses (of other makes) which are built too light for the work has prompted us to design the above *extra heavy* press, and it is the only one on the market that will produce a perfect proof of the smallest as well as of the largest half-tone plate. The register is perfect and for color plates it has no equal.

Catalogue and Treatise on Photo-Engraving.

Still, after all is said it remains to be recorded as a fact that the most rapid progress and the highest perfection in all the various lines of process engraving has been made in America, and to this day she more than holds her own in this line. Imitation is said to be the sincerest form of flattery, and if the adage holds true, then America is indeed honored by the adoption of her methods and machinery in process work the world over, for American planing, trimming, beveling and routing machines are today shipped to all parts of the world. In Chicago some of the largest plants in the world are established, and certainly, judging by results, some of the most skillful men are to be found there. While there is not afforded the opportunity to do work for high-class publications that exists in the East, still many of the productions, notably Stoddard's "Photographs of the World" and many of the railroad and bicycle brochures and catalogues show the skill and artistic taste and high standard of excellence that prevails in Chicago.

But after all is said still it remains a fact that nowhere in the world has it been demonstrated more clearly than in Chicago that the three-color process is a practical, commercial and financial success. This process is one of the great achievements of the century.

It is on record that as early as the seventeenth century German copper-plate printers had attempted to produce colored prints by the superimposition of the three primary pigment colors. A further improvement was made in the eighteenth century by the use of a black key plate. And now in the nineteenth century, with a larger knowledge of chromatics and the use of the spectroscope, printers are enabled to produce in three printings objects from life, and also paintings true in color, form and perspective that are little short of marvelous.

Clerk Maxwell first suggested in a lecture at the Royal Institution, London, 1861, the reproduction of natural colors by the super-imposition of the three primary colors of light. Then, in 1865, Baron Ransonnet, of Vienna, and at the same time Henry Collen, the Queen's drawing master, had the idea of printing colored pictures in three colors by taking photographs of the objects by red, blue and yellow rays, and making super-imposed colored prints from the resultant negatives.

In 1868 two Frenchmen, Charles Cros and Ducos du Hauron, published a similar idea. The first treated the matter theoretically while the latter made practical experiments. They came very near the true principle, but did not obtain satisfactory results. Further efforts were made in 1870 by Professor Hsuik at Prague and Joseph Albert at Munich, both of which had the advice and assistance of Professor Vogel, of Berlin, and Dr. Eder, of Vienna. These attempts were more successful, although the results were not all that could be desired. Dr. W. H. Vogel, of Berlin, in 1873 discovered that photographic plates could be made sensitive to various colors.

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WE furnish
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Improved Routing Machine.

Size of Table, 25 x 35.

Floor space, 2 ft. 6" x 3 ft. 6".

Weight, boxed, 850 lbs.

In a process establishment a routing machine should be the most reliable and important piece of machinery in the plant. The above machine is constructed to answer all requirements and demands that can be possibly made on it. It is used for cutting out all blank or white spaces that have not been etched to a sufficient depth to ensure clean printing. The spindle head runs at the speed of about 14,000 revolutions a minute, and cuts smooth and clean without leaving any burr and will suit the most exacting operator.

Catalogue and Treatise on Photo-Engraving.

Mr. F. E. Ives, of Philadelphia, in 1881, was the first to produce photo-chromic pictures on a printing press. He used single line screens, the plates being zinc-etchings. Later Dr. Vogel's son, Dr. E. Vogel, in conjunction with a lithographic artist named Ulbrich, of Berlin, produced photo-chromic pictures, but the system they worked necessitated the use of a gray tint plate, which is not necessary if the process be carried out on strictly scientific principles. Then Kurtz, of New York, simplified the process and adapted it to commercial use, but evidently was not financially successful, for he has ceased to operate it for some time. So, literally speaking, Chicago is the only place where this intricate process is being carried on successfully, there being three large plants in operation, one running no less than twenty-two steam presses on this class of work, no other city in the world having so many and such large establishments in this one of the most advanced industries of the age.

The position that Photo-Engravers of Chicago enjoy in their craft should be a further incentive to maintain their reputation and advance the excellence of their workmanship.

PRACTICAL PHOTO-ENGRAVING.

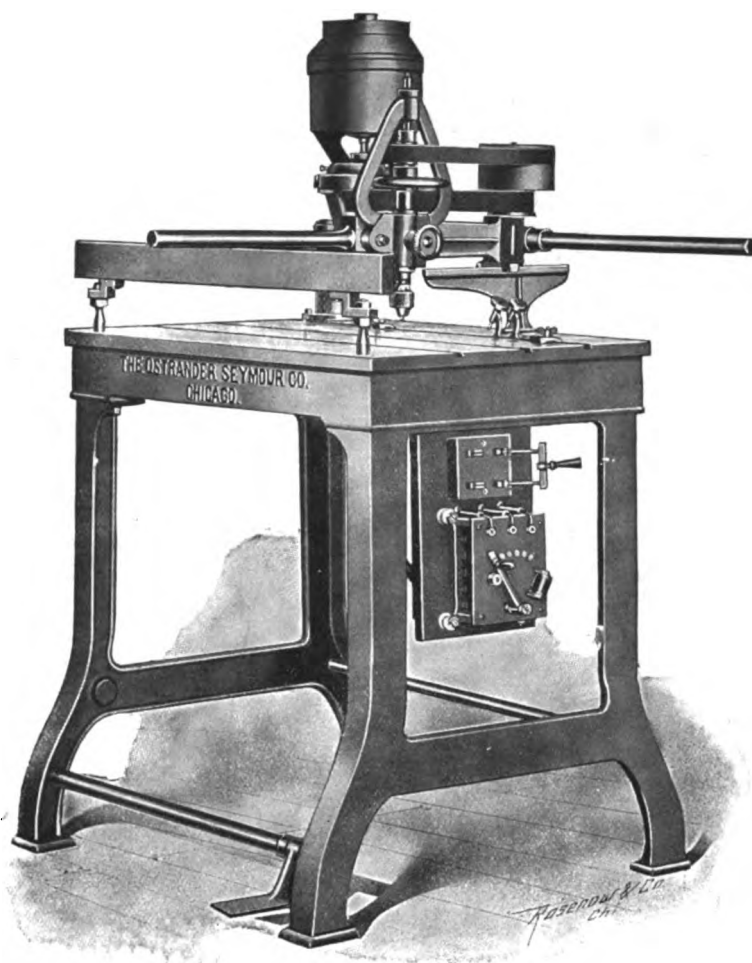
To every man of ordinary observation the wealth and profusion of illustrations in the magazines and newspapers of today is very apparent. All this is owing to the almost marvelous advance made in the graphic arts in the last ten or fifteen years, especially those arts that call to their aid photography. Look at an old number of some magazine or newspaper and notice the paucity and in many cases the crudity of the illustrations; and compare them with an up-to-date ten cent magazine or the mammoth illustrated Sunday newspaper of today.

The methods by which all these illustrations are made are covered by one comprehensive term, viz.—photo-engraving, the following being the four main branches: photography in line, photography and half-tone, etching in line on zinc, and etching in half-tone on copper.

There are several other methods of engraving in which photography is employed, such as collotype or photo-gelatine and photogravure, as well as an application of half-tone to steel engraving. But none of these are engraving in relief suitable for rapid surface printing on a steam press; so only photo-engraving in line and half-tone will be treated on in the following pages.

The great desideratum in a photo-engraving establishment is light both to photograph by and also for the etchers and engravers to work by. It is not necessary that the room should be at the top of a building, for many firms now-a-days use the electric light to the exclusion altogether of daylight for photographic purposes. But nevertheless, light, airy rooms are very desirable, especially in view of the fact that the use of fine screens have become so common.

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Improved Routing Machine.
WITH MOTOR DIRECT CONNECTED.

Size of Table 25" x 35", floor space 2 ft. 6" x 3 ft. 6"; weight, boxed, 850 lbs.

This is the same machine as shown on preceding page and only shows the effective manner in which we direct connect our machines.

Catalogue and Treatise on Photo-Engraving.

Having secured a well lighted room or rooms on any floor, presuming, of course, we are not going to use a skylight, we will proceed to install a plant. The necessary apparatus and machinery required to equip a small plant will be given for each department, and they will be taken in their turn as the plate goes through the various processes. The most highly prized and important article in an outfit is

THE LENS.

There are several good makes on the market, such as Dallmeyer's Steinheil and Ross all rapid rectilinear. Lately there has come into favor (though more expensive than the above mentioned) the Goerz and Ziess Anastigmat Lenses. The two great requirements of a lens for photo-engraving, is that it should be rapid and of good covering power, it cutting sharp to the margins of the plate.

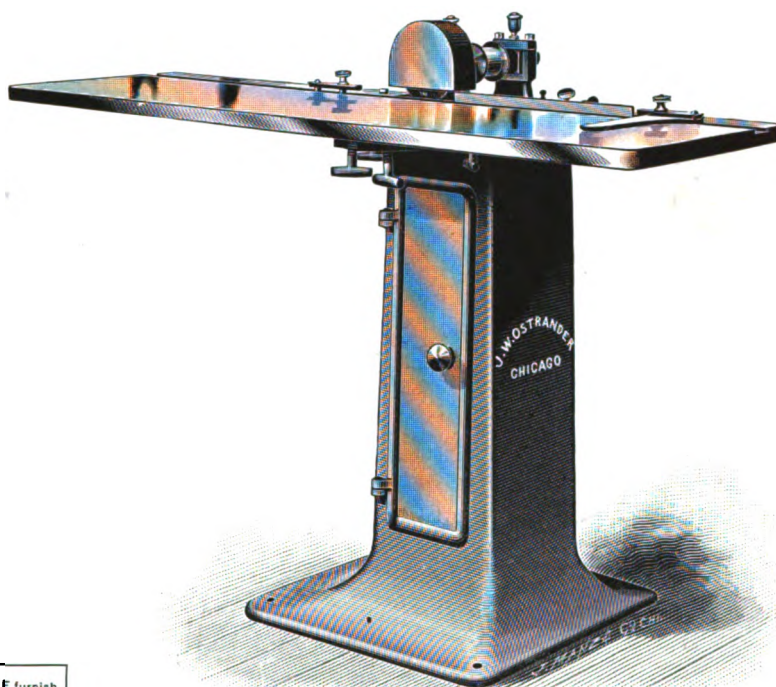
THE CAMERA

should be of the type known as the enlarging, copying and reducing camera, it possessing many advantages over the ordinary copying camera.

The plate-holder should have adjustments for carrying the screen and gear of some kind for regulating its distance from the sensitive plate. Of course, these arrangements are not necessary if line work only is to be done. But it does no harm to get a screen carrying plate-holder and if occasion should arise to try half-tone you are ready to do it without any further outlay beyond the purchase of a screen. Plate-holders of the above kind are easily obtainable from any photo-engraving supply house.

The matter of having the camera on a stand or swing should be determined by the nature of the building. If there is much machinery operated on the premises or the floors are not very firm it would be well that the camera be swung, and if there are none of these drawbacks the camera can be placed on a stand resting on the floor. The average length of bed for say an eleven by fourteen camera should be about twelve feet and about eighteen inches wider than the camera. It should be made out of wood about two inches by six inches, with a movable board about four feet long sliding along the top upon which the camera should be fastened. At one end an easel-like arrangement to carry a copy board about three feet by two feet six inches should also be fixed, the same to run in a groove, the whole to be fitted dead square and true with the front of the camera, if not the pictures will not come sharp at the extreme edges. The camera being complete, we must now devote some attention to the darkroom. This room should be about six feet square, seven or eight feet high, the door of the room to be as near as possible to the end of the camera. The window of this room should be about twenty-four inches square, and of light yellow glass and four feet from the floor. A sink two by three feet should also be built directly beneath the window, the top of the sink being about three feet six inches from the floor. A shelf three feet high and

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Old Style Beveling Machine.

Will bevel any size up to 24 x 24.

Floor space, 2 ft. 6" x 4 ft.

Weight, boxed, 700 lbs.

A beveling machine is indispensable to an establishment doing any quantity of half-tone work. The above illustration is our old style beveling Machine and is equal to any and superior to many on the market at the present time. It does away with all sawing, as it cuts through the plate far enough so that the unused or waste metal can be broken off with one's hand quite easily. This metal, if one desires, can remain on and be used as a bearer while proving, that is if such is done before the plate is mounted. The machine cuts a fine, clean bevel and does not leave a burr.

Catalogue and Treatise on Photo-Engraving.

eighteen inches wide ought also to be built and run round three sides of the room. The water pipe carrying the faucet should project about one-third the width of the sink and level with the bottom of the window.

We must now turn our attention to the chemicals used in making a negative, and they will be mentioned as we go along.

First let us prepare the collodion, of which I will give two formulas, the first for line, the other for half-tone.

FOR LINE WORK.

Ether.....	32 ounces.
Alcohol	32 "
Bromide Cadmium.....	128 grains.
Iodide Ammonium	320 "
Negative Cotton	1 ounce.

FOR HALF-TONE WORK.

Ether... ..	32 ounces.
Alcohol	32 "
Iodide Cadmium.....	150 grains.
Iodide Ammonium.....	90 "
Chloride Calcium.....	30 "
Chloride Strontium.....	30 "
Negative Cotton	1 ounce.

A silver bath must now be made up, and the quantity desired will be determined by the largest picture our camera will make. A good rule to bear in mind is that one ounce (troy weight) of silver to twelve liquid ounces of water gives a test of forty with the hydrometer, or as it is often termed, argentometer.

To prepare the bath, take as much distilled water as required, and for every twelve ounces of water take one ounce of nitrate of silver, shaking up till silver is dissolved, then add ten grains of iodide of potassium dissolved in about two ounces of water. The potassium is added to iodize the bath, but another plan can be adopted, and that is to leave an eight by ten plate coated with iodized collodion in the silver bath over night. But before either of the above are added the bath should be acidified by adding about twenty or thirty drops of nitric acid, c. p.

It would be well to test now with blue litmus paper for acidity. If the litmus paper does not turn red there is not sufficient acid in the bath, and more should be added until the reaction is decided. All should now be filtered carefully.

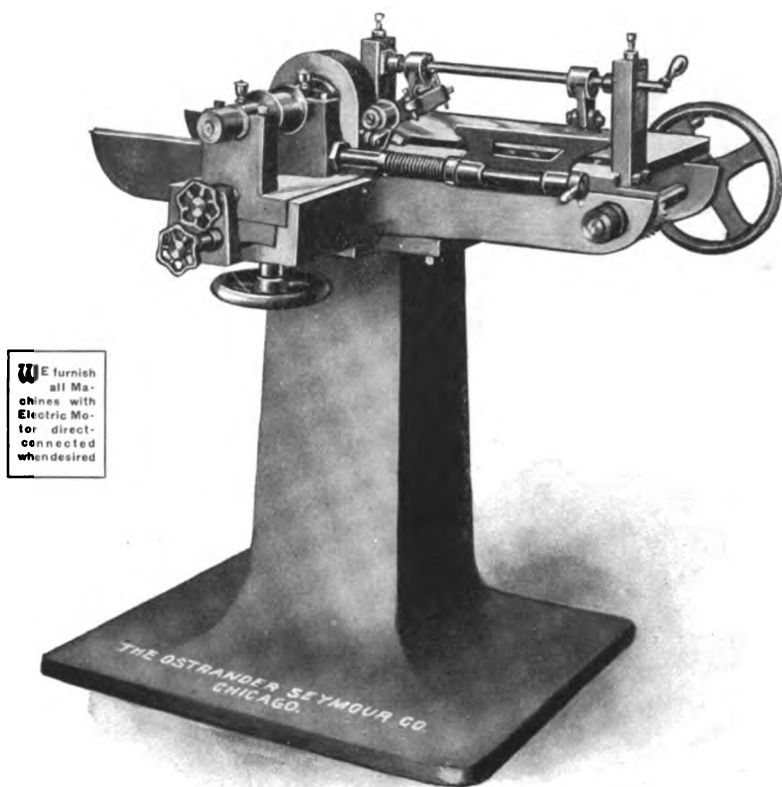
Before we proceed to expose a plate other solutions must be got ready and the first of them is the developer, which is composed of

Protosulphate of Iron.....	2 ounces by weight.
Water.....	40 "
Acetic Acid No. 8.....	6 "

The other solutions are the ones we intensify or increase the density of the negative with and they are:

For line work a saturated solution of bichloride of mercury in which the negative is allowed to lie till it bleaches, then taken out and washed,

The Ostrander Seymour Co., Chicago, U. S. A.



The Beveling and Lining Machine.

No. 1—Size 16 x 16, floor space, 3 ft. x 4 ft.; weight, boxed, 850 lbs.

No. 2—Size 24 x 24, floor space, 3 ft. 6" x 4 ft. 6"; weight, boxed, 1,000 lbs.

The above illustration is our very latest improved half-tone beveling and lining machine and is certainly a marvel of the times. Any thickness of plate can almost instantly be set and clamped on the table and the beveling and lining is done without resetting. Several cuts can be taken off in the one setting, which permits the operator to work to one-thousandth part of an inch in accuracy. The cut is clean and owing to the construction of cutter head it is an impossibility to leave a burr.

This machine belongs to the class of bevelers that leave a "proving bearer" surrounding the beveled edge of the engraving, which bearer can be removed at will by hand or by the aid of a pair of pliers, according to the depth of the cut—this being entirely under the control of the operator. Engravings may, however, be beveled without leaving the surrounding bearer if desired, or the machine can be used for cutting a plain rabbet instead of a bevel by simply using appropriate cutters for the style of work preferred. By a very simple adjustment the machine can be changed to do electrotype beveling without changing the knives.

Catalogue and Treatise on Photo-Engraving.

and after hydro-sulphuret of ammonia, diluted, one ounce to two ounces of water, is poured over till the film is blackened right through.

The following intensifying solution is used almost exclusively for half-tone negatives, though many use it for line work.

Sulphate of Copper.....	2 ounces.
Bromide Potassium.....	½ ounce.
Water.....	20 ounces.

The negative is allowed to lie in this till bleached white, after which it is washed thoroughly, both on the film side and back, then a solution of silver nitrate is flowed over till the film blackens. The silver solution is as follows:

Nitrate of Silver.....	60 grains.
Citric Acid.....	10 "
Water.....	4 ounces.

The glass upon which the negatives are to be made should be soaked in nitric acid and then thoroughly cleaned by scrubbing with a soft brush and rinsed under running water, drained for a moment and then flowed over with a solution of albumen made up of the white of one egg, forty ounces of water and four drops of ammonia. The albumen can be omitted and the plates just washed and put in a rack to dry, and before coating with collodion a margin of thin rubber solution can be run around the edges to insure the adherence of the film to the glass. Allowing that the glass is dry after a coating with albumen, or, say having rubbered the edges we will now proceed to coat a plate with collodion and immerse it in the silver bath, lowering it down steadily without stopping till it touches the bottom.

If you stop the lowering before the plate is fully covered a streak will be made across the plate. The time required for immersion should be from two to three minutes, and while the plate is resting in the bath we will proceed to get the copy ready of which we are going to make a plate. It should be tacked on the copy board upside down so that the image will be right on the ground glass. It should be focused with a fairly large diaphragm and then stopped down to the smallest one that comes with the lens.

The time of exposure must be judged by the size of the reduction quality of the lens and brightness of the illumination. The greater the reduction the shorter the exposure. Weak gray or blue lines are hard to reproduce and the exposure should be as short as possible. If the drawing is on tracing paper a sheet of white paper should be laid beneath it before it is tacked down. All oiled paper or paper with a red or yellow tinge does not readily photograph. We will now retire to the dark room and lift the plate out of the bath, place it in the plate-holder and put it up on the camera and draw the slide. The exposures for line work rarely run over five or ten minutes, more often it only being two or three minutes. After the time set has expired we replace the slide and again retire to the

The Ostrander Seymour Co., Chicago, U. S. A.



Sawing Machine—Class A.

No. 1—Size of Saw Table 20 x 24, floor space, 2 ft. x 2 ft.; weight, boxed, 500 lbs.

No. 2—Size of Saw Table 28 x 32, floor space, 3 ft. x 3 ft. 6"; weight, boxed, 700 lbs.

The above circular saw, class A, can be put to many uses in an engraving establishment and is in fact one of the most all-'round pieces of machinery a plant can possess. It can be used for cutting up zinc or copper to the required sizes, to make the prints on preliminary to etching, and also for sawing the etchings up close to the work after they have been routed. This saw will cut through a solid or cored base quite easily, which is very necessary where a quantity of newspaper work is done. It will cut mounting wood equally as well. A number of cuts can be mounted on one piece of wood and the whole taken to the saw and cut separately previous to being squared on the trimmer or shoot board.

Catalogue and Treatise on Photo-Engraving.

dark room to develop the plate. Hold the plate in a horizontal position in the left hand, and swish or pour the developing solution in one sweep from left to right over the plate. Don't let too much of the developer run off the plate, as the more we keep on the denser the negative. Keep moving the plate so that the developer is kept in motion. If the exposure was well timed the image will appear in a few seconds, the white parts of the drawing appearing dark and the lines remaining the same color that the film was before development.

If the picture develops up almost immediately the plate has been over-exposed, and another exposure must be made. On the other hand, slowness in the appearance of the picture and lack of detail shows under-exposure. But if the exposure has been right and you consider the whole of the picture is up, further development is stopped by washing the plate under the faucet with a good flow of water. After thorough washing the plate must now be fixed with a solution of cyanide of potassium, one ounce to ten ounces of water. This is to remove the silver that has not been acted on by the light. It is better to do this before leaving the dark room. After the unaffected silver has been cleared away the plate must again be thoroughly washed or else bad stains will occur during intensification. For half-tone negatives it is well to focus with a full opening of the lens and if the picture is flat or dull a piece of print torn from a newspaper should be placed alongside the copy, and that focused till sharp. We will now see that the screen is clean by breathing on it, and if marks appear and the moisture rests there it must be rubbed gently with fine chamois leather till the marks are gone and the moisture of one's breath does not adhere, but evaporates quickly. The screen should now be placed in the plate-holder and the separation of screen from sensitive plate be determined on. The finer the screen the less latitude allowed in moving it and the nearer it should be to the sensitive plate. A good rule to follow is for light subjects far away, dark subjects nearer to the screen; but this can be obviated by using larger or smaller diaphragms during exposure. The averaged distance that say, a one hundred and fifty line screen is worked, is from one thirty-second to one sixteenth of an inch, while sixty-five or eighty-five line screens as used so much today for newspaper work, they give as much as one fourth to three eighths of an inch separation between the screen and the sensitive plate. All this is only the work of a couple of minutes and now having set our plate-holder in a convenient position in the dark room we will close the door and lift out the plate from the bath, leaning it against the wall (which has previously been covered with a piece of clean cardboard) to drain, and wiping the back with some soft tissue paper. Now lay a strip of blotting paper on the trough or bar that the plate will rest on. The idea of this is to save the silver that drains during exposure and ensures clean working of the plate as well as saving the plate-holder from the rotting effect that nitrate of silver has on wood.

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Sawing Machine—Class B.

Size of Saw Table, 28 x 32.

Floor Space, 3 ft. x 4 ft.

Weight, boxed, 800 lbs.

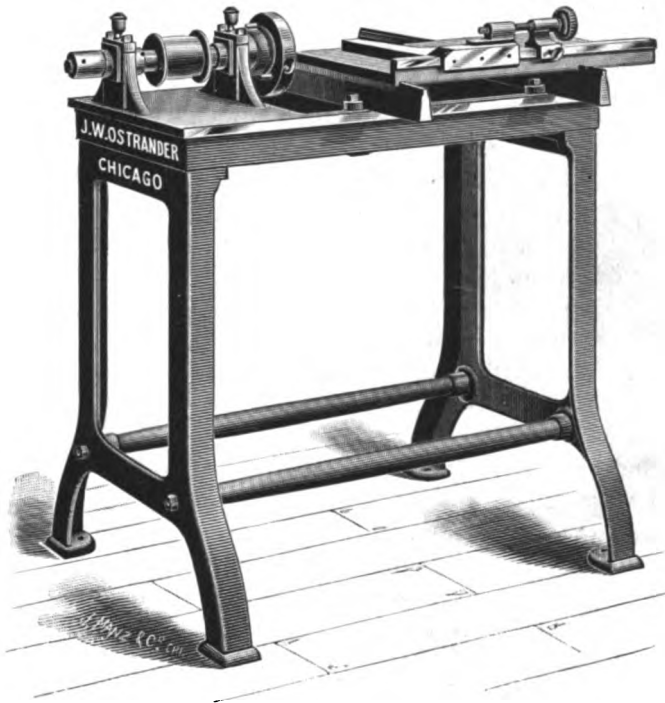
This saw is similar to that of class A, only a little heavier in construction and belted from a counter-shaft made directly onto the frame of the machine, which gives it a greater range of swing on the table. It may be used for all the purposes of the other saw, but is intended for large establishments where a saw is used especially for wood work and heavier classes of work. Both machines are very strong and rigid in their construction embodied in very graceful outlines.

Catalogue and Treatise on Photo-Engraving.

Now set the plate in the holder, put on the back (see the ground glass is removed) and then place on the camera seeing that it fits snug and even all round. Before drawing the slide see that the lens is capped; if it is, draw the slide and proceed to decide on the size of diaphragm or stop you are going to use. The usual method now of working is to expose for the shadows first with the smallest but one stop, and the length of this exposure is determined by the reduction in size of the copy and the color. The exposure may run from five to ten minutes, perhaps to twenty minutes if the reproduction is to be the same size as the original. If the copy is very black with shadows showing little detail, the exposure can be shortened and a smoother result obtained and a good firm shadow dot procured by the operator holding a sheet of white cardboard in front of the original, during the exposure with the smaller stop. The length of exposure to white paper will vary from twenty seconds to one minute. We will now put the cap on the lens and change the diaphragm or stop for a larger one, say f-sixteen; but experience must determine which to use. This last exposure will last about one minute and its purpose is to flash up the highlights, and join the dots firmly at the corners. Many operators use the round diaphragms as supplied with the lens, but Mr. Levy, the screen manufacturer, advises the use of a square diaphragm which can be cut out of thin cardboard. The beginner in half-tone should use only one size diaphragm till he becomes accustomed to the effects it produces. We will now proceed to develop the same as a line plate, only we must watch in this case the shadows or dark parts of the picture, and when we see that the detail or small dots are all up through the blacks, then we stop development, wash thoroughly and fix with cyanide. If the negative is looked at through a focusing glass we ought to have the dots in the highlights just joining at the corners, and a small, firm dot through the blacks. We will now intensify it as directed, in the copper and silver solutions, washing it a minute or so between each dip, or solution, and view the negative again through the focusing glass. If the highlights are not joined up sufficiently to allow the reduction of the shadows, put it through the copper and silver again. Now the lights should be well closed up and the dots in the shadows good and firm. From now on all depends on the skill of the operator in manipulating the negative and treating it locally where needed.

The negative is now bleached with a deep colored saturate solution of iodine crystals dissolved in water by adding iodide of potassium. When the iodine has penetrated the film the plate is then washed, and a very dilute solution of cyanide is poured over the plate and its action watched. The negative will gradually gain in color, the dark parts of the picture becoming darker as the dots become smaller in the shadows, and at the same time all fuzziness around the shadow dots and mist or fog between the dots in the highlights being cut away by the action of the cyanide. This must not be carried too far or else the smaller dots will be eaten clean away, leaving clear glass and resulting in a smudgy-looking picture. The

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Trimmer.

- No. 1—Size of Table 12 x 18".
Floor space, 3 ft. x 3 ft.; weight, boxed, 500 lbs.*
- No. 2—Size of Table 16 x 18".
Floor space, 3 ft. x 3 ft.; weight, boxed, 550 lbs.*
- No. 3—Size of Table 24 x 24".
Floor space, 3 ft. 6" x 4 ft.; weight, boxed, 850 lbs.*

The above illustration shows a very accurate and nicely adjusted machine, designed for trimming or dressing the sides of blocks, either metal or wood. It is provided with micrometer adjustments to the squaring gauges, insuring the trimming of very fine and accurate work, and with the addition of the line-holder very thin lines, either metal or wood, may be trimmed with absolute precision, and our safety head prevents accidents.

Catalogue and Treatise on Photo-Engraving.

negative, when finished, should have all the gradations of color that the original has, starting from a dot in the shadows as fine (but dense) as a pin point, gradually enlarging till the dots just touch in the middle tones and join up quite firmly at the corners in the highlights. It should now be blackened with hydrosulphuret of ammonia in the proportions given for intensifying negatives treated with mercury. If it takes on a greenish tinge it can be cleared away by just pouring over the negative a dilute solution of nitric acid, one ounce to ten ounces of water. It can now be placed aside to dry, preparatory to ruling the lines around it or for the purposes of stripping. Many establishments in their half-tone departments use prisms to obviate the necessity of stripping their half-tone negatives, though their line negatives are always stripped. Many will not be able to afford prisms as they are rather expensive articles, and it is very little trouble to strip. As soon as the negative is dry it should be coated with a thin solution of India rubber dissolved in benzine or rubber cement thinned down with benzine. When the rubber is set and dry flow over it a plain collodion made up as follows:

Alcohol.....	16 ounces.
Ether.....	16 "
Negative Cotton.....	$\frac{1}{2}$ "
Castor Oil.....	3 drams.

After collodion is dry cut and trim negative to size desired and if albumenized glass has been used it should be soaked in water, ten ounces, acetic acid, three ounces, or if the edges of the glass have only been coated with rubber the acetic acid can be omitted as water will be sufficient to release the film. Do not flow over the negative either the rubber or the collodion while the plate is warm. It is usual to strip as many negatives as possible on given sizes of glass. Such sizes as, say ten by twelve, eleven by fourteen, fourteen by seventeen, but care must be taken not to put them too close so that room will be left for sawing them apart. When the stripped negatives are dry they are ready for printing on the zinc or copper as the case may be.

We will now proceed to make a print and etching on zinc. As all zinc sold nowadays for process work is polished it will only be necessary to remove the greasiness by rubbing with a wet tuft of cotton dipped in fine powdered pumice stone, after which it is thoroughly rinsed and then (while still wet) coated with the following sensitizing solution:

White of one egg.	
Bichromate of ammonia.....	20 to 25 grains.
Water.....	8 to 10 oz.

The egg should be beaten up with two ounces of water and allowed to settle and then added to the remaining water, after which the bichromate of ammonia should be powdered in a mortar and added also and the whole shaken till the bichromate is thoroughly dissolved. Ammonia should now be added till the solution turns a bright lemon yellow, and then it should be

The Ostrander Seymour Co., Chicago, U. S. A.



Combined Saw and Trimmer.

*No. 1—Size of Saw Table 20" x 24", size of Trimmer Table 16" x 18".
Floor space 3 ft. x 3 ft. 6"; weight, boxed, 800 lbs.*

*No. 2—Size of Saw Table 28" x 32", size of Trimmer Table 24" x 24".
Floor space 4 ft. x 5 ft.; weight, boxed, 1,000 lbs.*

For small establishments the above machine—a combined saw and trimmer—is very desirable, both from the point of economy as an investment, and efficiency in doing the work it is constructed for. It economizes space and reduces the number of movements of the operator, as both sawing the block square and the trimming of it is done on the one machine.

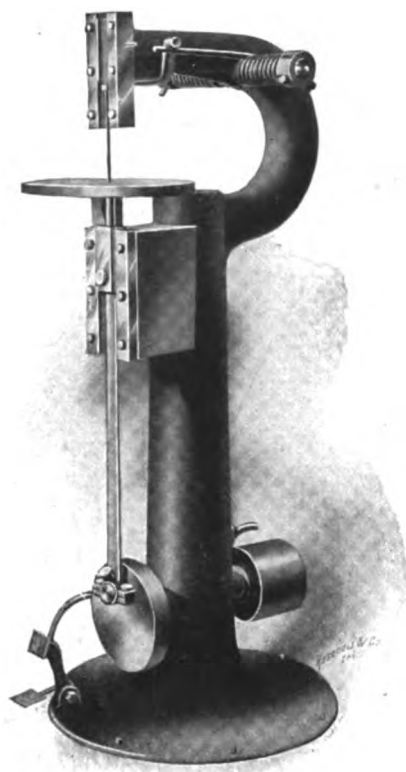
We respectfully ask prospective purchasers to compare this machine with other so-called combined saw and trimmers.

Catalogue and Treatise on Photo-Engraving.

carefully filtered two or three times. To coat the plate a small amount should be poured on first to remove the excess of water and this should not be saved, but the excess of the next application should be poured into another bottle and filtered before using again. Take care that no bubbles or dirt specks get on the plate when you flow, for they will show. Now that you have a nice even coating on the zinc, dry by gentle heat, not getting the plate any hotter than your hand can stand, blowing the plate gently all the time from the top left hand corner so that the solution will not dry in streaks. Now stand it aside to cool and get the printing frame ready. This frame must be a substantial affair strong enough to allow the zinc to be forced into contact all over. The glass in the frame must be fully an inch in thickness or else it won't stand the pressure. The zinc plate now being cool we will place it on the negatives in the frame, putting at the back of the zinc three or four sheets of paper so as to allow a little spring. Now put in the back or board, bring down the bars and clamp or catch them according to the mechanism of the frame, and turn the screws till they all give an equal resistance which you can readily feel. The frame is now carried to the electric arc light and stood about eighteen inches to two feet away from it and exposed from four to ten minutes, according to the fineness or coarseness of the lines. When the exposure is up remove the frame to the darkroom, unscrew and lift out the zinc plate. Roll out some good stiff lithographic ink, see that it is free from lumps or specks on the roller, lay the zinc down and proceed to ink it up by going over it with a firm and steady pressure in rolling. When you have spread the ink out smoothly then place the plate in a dish of water and allow it to soak for a minute or two. Then take a tuft of soft absorbent cotton and rub gently, when the ink should come away easily, leaving clean, bright zinc except where the lines of the drawing should be, and they should be good and firm without smudge. If the exposure has been right there should be no trouble, but if the ink will not move the plate has been over-exposed. Sometimes, if it is not badly over exposed, a drop or two of ammonia added to the water in the developing dish will release the ink. The print being all right, the water on its surface is soaked up with a piece of chamois leather and then dried thoroughly by gentle heat. If the plate is warmed too much the ink will spread, consequently the lines of the drawing thicken. All imperfections, such as broken lines etc., are now touched up and the plate powdered with dragon's blood—a dark, red, resinous powder—and brushed thoroughly clean, and then warmed over a gas stove till the redness disappears and the powder amalgamates with the ink. The back of the plate is now painted with asphaltum dissolved in turpentine to protect it from the acid. We will now prepare the acid that we are to etch with.

An etching tub about twenty-two inches by thirty-four inches and six inches deep is required and this should be thoroughly water tight, and coated with pitch inside to protect it from the acid, which eats or rots

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Small Jig Saw.

Size of Table 12".

Weight, boxed, 400 lbs.

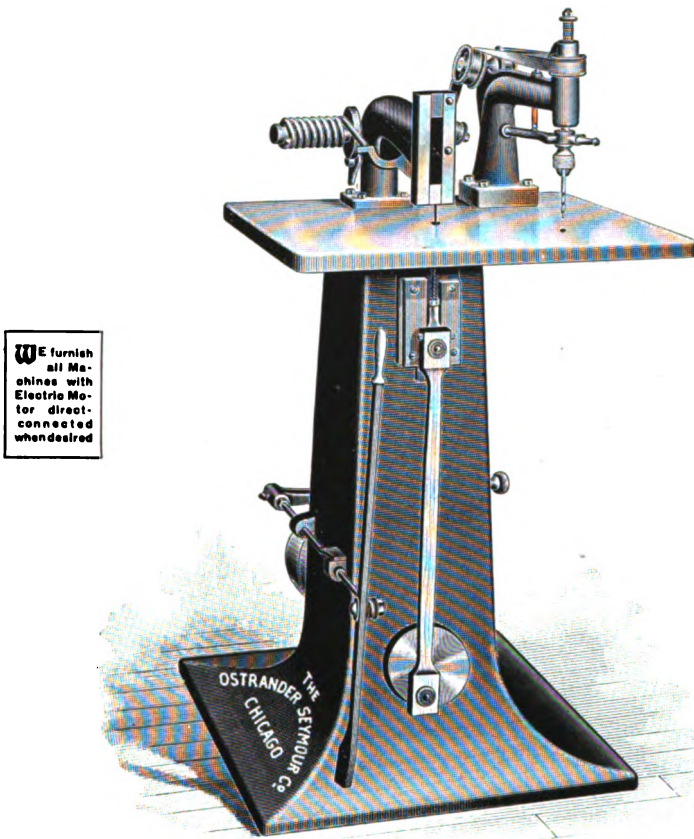
The above jig saw has been designed to meet the requirements of small establishments where the expense of the Class A and Class B Machines, as shown on pages 25 and 27, is too great and the work too small. It is a very accurate machine, and for ordinary work is as good as the A or B.

Catalogue and Treatise on Photo-Engraving.

wood very readily. A strip of wood about four inches thick should be fastened across the exact center of the bottom of the tub so that it can be rocked, and the acid flow smoothly across the plate, allowing the gas that is generated by the acid attacking the zinc to escape. The first etching bath should be about two ounces of commercial nitric acid to forty to sixty ounces of water. The stronger for coarse newspaper work, the weaker for fine work. The first bite should be carried far enough till the sides of the lines appear bright. The acid should then be rinsed off, the plate dried and then powdered up four ways with dragon's blood. The proper method to powder a plate is to dip one end of the plate into the powder and shovel it up onto the plate, letting the powder fall off at the other end; then take a brush about four inches wide and brush the surplus powder off from left to right, inclining the handle of the brush to the right, which gives the brush a dragging motion and so packs the powder up against the left hand side of the line. While the powder is kept against the line as before stated, yet the bottom must be kept clean and no powder allowed to adhere in the white spaces, else we will get a dirty etching. The other three sides of the plate must be treated the same and between each powdering the plate is heated till the powder is melted. The etching bath should now be strengthened by the addition of another two ounces of acid, and etched the same as above, and afterward powdered as before, strengthening the bath each time by the addition of more acid which experience will enable you to increase, at the same time, of course, demanding more vigilance in watching the finer lines as the plate gets deeper. Three bites is the usual number given to work in commercial shops and four or five in newspaper work. When sufficient depth has been gained the plate is made hot and then soaked in a strong solution of lye or potash and scrubbed with a stiff fibre brush which removes the ink. After drying, the plate is ready for the router to take hold of and finish and block. Some rout the plate before the resist of ink and powder has been cleaned off, but if this is done it is advisable to powder the top of the plate with fine plumbago, which presents a smoother surface and gives less chance for zinc chips to adhere and so mar the ink surface. After the plate has been routed it can be etched in weak acid similar to the first bath and thus all burrs and shoulders are taken away, and the plate will require less trimming; but this method is not recommended to beginners, but is only mentioned so that those who care can adopt it.

Copper is generally bought already polished, and a piece having been cut suitable for the size of the negative that is to be printed, a margin should be allowed of about one quarter of an inch all around. The edges should be filed smooth and the copper polished with whiting and water made into a thick paste, with a few drops of ammonia added. While still wet the copper should be taken to the dark room and coated with either of the following enamel solutions:

The Ostrander Seymour Co., Chicago, U. S. A.



Combination Jig Saw and Drilling Machine. Class A.

*Size of Table, 30 x 36".
Floor space, 3 ft. x 3 ft. 6".
Weight, boxed, 800 lbs.*

The above combined machine is a very necessary adjunct to process firms doing a large volume of half-tone work. By it mortising and cutting out inserts can be done neatly and handily. Ovals and any unusual shapes can be cut out also either in metal or wood. This machine will do more work and break less saws than any other style machine placed on the market. The machine runs at a very high rate of speed and its work is fine and clean.

Catalogue and Treatise on Photo-Engraving.

Clarified Le Page's Glue.....	2 ounces.
Bichromate Ammonia	120 grains.
Water	4 ounces.
Dried Albumen.....	$\frac{1}{4}$ "
Water	4 "
Chromic Acid, c. p.....	10 grains.

In the following solution albumen is omitted and the writer has found it to work equally as well as the above.

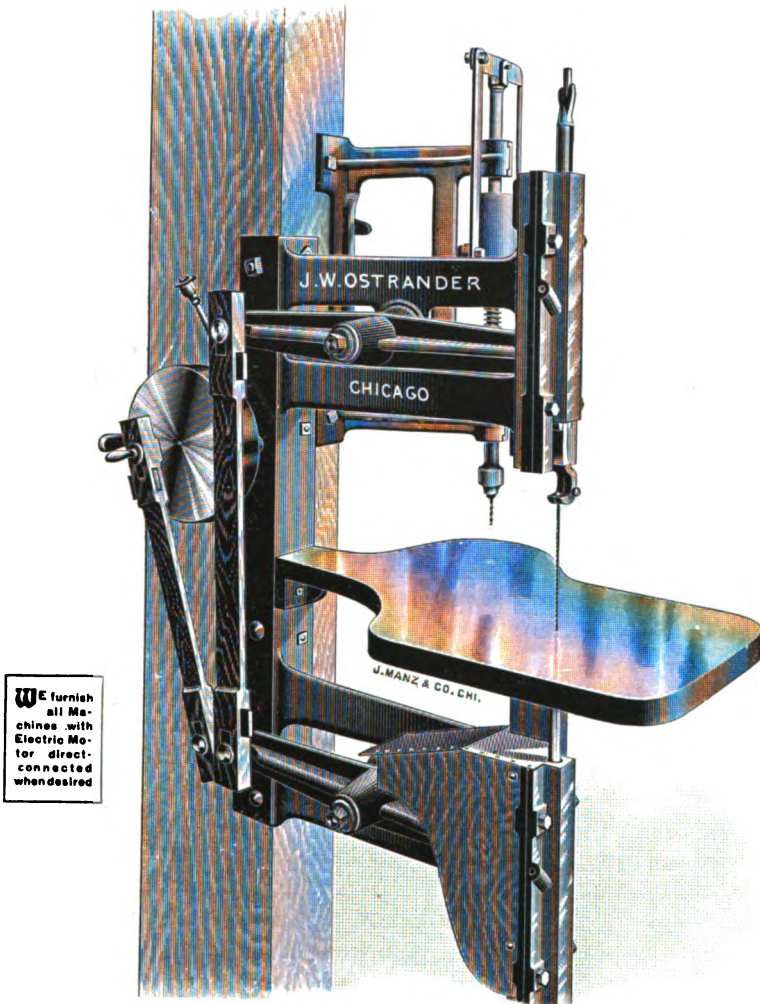
Clarified Le Page's Glue.....	3 $\frac{1}{2}$ ounces.
Water	10 "
Bichromate of Ammonia.....	80 grains.

And enough ammonia added to turn solution a light lemon color. Filter two or three times before using.

There are many modifications of the above solution in use, some using gum Arabic, which they dissolve to the consistency of the above mentioned glue, and then use it in proportion. But the results in the end are the same, and the above formulas will be found quite serviceable. These solutions being much thicker than those used for zinc, and a smoother and more flawless coating being desired, a whirler must be used to insure it. A whirler can easily and cheaply be made by procuring two strips of wood about eighteen inches long and two inches wide and hinged at one end. A strong rubber band capable of being extended to about eight inches should be fastened on the outside of the strips about equal distance from both ends, and the band should be strong enough to allow an expansion of about ten inches. At the other end of the strips there should be grooves or notches cut so that the plate may be set square in the grooves or the opposite diagonal corners of the plate in the notches. The last is the cleanest way of working. The grip of the whirler should be of sufficient strength to hold the plate quite firmly. A string ought now be fastened to the ceiling directly over the gas stove in the darkroom in which the plate will be coated, and the whirler suspended at a distance of about six to ten inches above the flame of the stove.

The plate can now be coated and placed in the whirler face downward and whirled over the gas till quite dry. See that you get no bubbles or specks in flowing, and do not get the plate too hot. The printing solution should be filtered frequently and well, and if possible always have sufficient on hand for the day's work, as filtration is exceedingly slow with this solution. Be sure the plate is cool before it is placed in contact with the negative, and also warm the negative so that all moisture will be removed. Expose under the half-tone negative as directed to in line work, and when the exposure is considered sufficient remove from the printing frame and develop under a gentle stream of water, then flow over the print a strong solution of violet aniline dye when the picture will appear quite plain. Development can now be done locally by holding those parts not sufficiently developed directly under the faucet. When the print appears all right flow over it some alcohol to remove all water and dry by heat, setting

The Ostrander Seymour Co., Chicago, U. S. A.



**Combination Jig Saw and Drilling Machine.
Class B.**

*Floor Space, 2 ft. x 3 ft. 6".
Weight, boxed, 600 lbs.*

This machine is adapted to the same usages as the previous machine, class A, the radical difference is that it is what is known as a "post-pattern" jig saw instead of being made on a pedestal.

The large post is furnished with the machine and occupies very little room.

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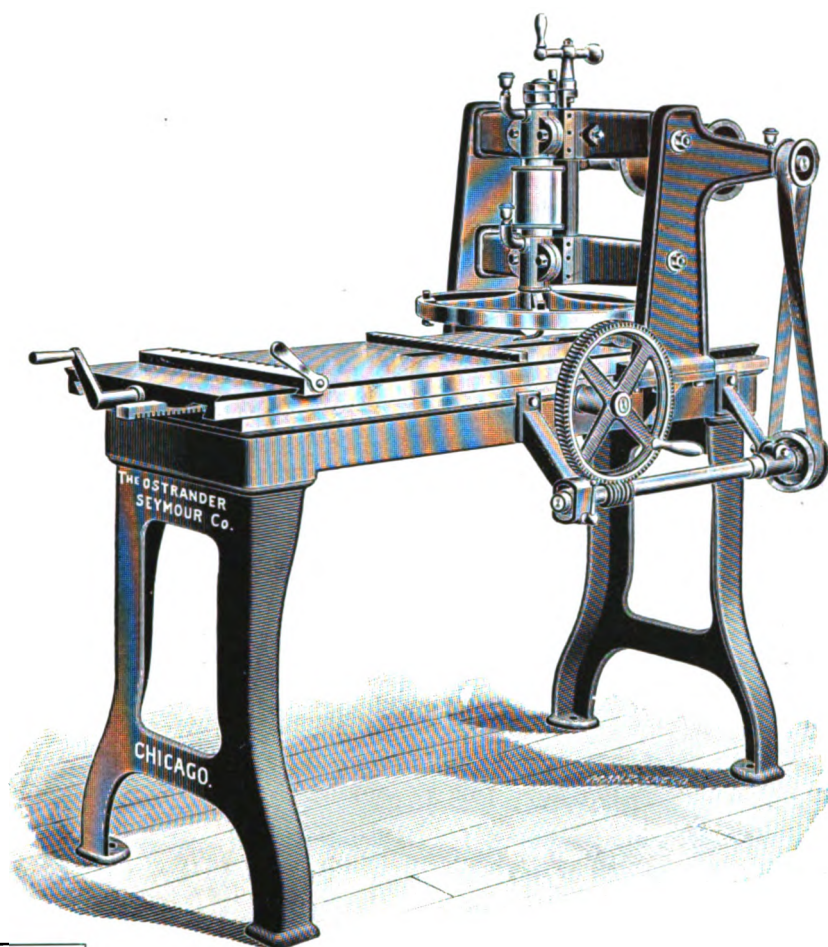
on fire the alcohol remaining on the plate, or standing the plate up to dry spontaneously. The plate should now be burnt in till the picture assumes a dark chocolate brown, for beyond this the enamel becomes charred and lifts when placed in the etching solution. If the enamel solution is fresh it will not burn in so dark as when it has ripened for a day or so. If the negative was all right and the print has been timed correctly we should have a picture on the copper composed of dots beginning in the blackest parts of the picture with a very fine dot barely discernable, and ranging on through the varying tones of the picture till in the highlights we get a large, firm, isolated dot that almost joins at the corners. Absolute blacks and fine highlight dots should be avoided. The first gives a smudgy picture and debars much improvement being done if needed to the lower tones of the picture. The second precludes a good printing depth being obtained for the plate.

All white spots and defects should now be touched up with asphaltum, and the plate warmed to harden the spots just retouched, and the back painted with shellac dissolved in alcohol. It is now ready for etching.

The etching solution, per chloride of iron, is usually bought in solution, but some prefer to buy it in lump and dissolve it in boiling water. It should never be allowed to go below forty degrees in strength as tested by Baume's hydrometer, for the weaker iron solution becomes the more powerful its action, and if a saturate solution was used it would be found that it would hardly act at all on the copper unless a great deal of time was allowed, which of course cannot be done on commercial work.

The etching should take from five to ten minutes, according to the nature of the subject. A very good wrinkle in etching is in case of an overprint to etch face upwards and brush continuously those parts that are dark or that need lightening up. If you have a nicely timed print, and even in color, etch it face downwards. This is done by taking a piece of mounting wood about three inches wide and cutting a notch one quarter of an inch deep and about one half an inch from the end. One edge of the plate is stuck in the notch face downwards and in this position it is placed in the iron. When it is thought to be etched sufficiently it is washed thoroughly under a faucet and then placed in a solution of acetic acid four ounces salt (table) two ounces by weight, water, ten ounces. The object of this bath is to prevent oxidization, and clean and brighten the plate up. It is washed under the faucet again and the surplus water soaked up with a chamois leather. Now dry by gentle heat, and pull a proof to see what further work it requires. If in the proof the lights are not bright enough, and the picture lacks snap, paint out all those parts of the picture except the lights. The paint should be a good asphaltum varnish or asphalt dissolved in turpentine to the consistency of molasses. When all parts of the picture have been covered except the lights, warm slightly over a stove to make paint set, then etch again for three or four minutes, wash the paint off and pull another proof to see if satisfactory. If it is not it can be

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Improved Daniels Planer.

No. 1—Size of Table, 16 x 30".

Floor space, 2 ft. 6" x 5 ft.; weight, boxed, 1,600 lbs.

No. 2—Size of Table 27 x 53".

Floor space, 3 ft. x 6 ft.; weight, boxed, 2,700 lbs.

This machine is especially designed for preparing lumber for plate makers, and if properly used will pay for itself in a short time. Save money by planing your own lumber, and at the same time know that your plates are mounted true and accurately *type-high*. The type-high adjustment on our planer is a great thing.

Blocking wood cannot be dressed perfectly true without employing the Daniels planer to take the warp out of the lumber. The Daniels planer is also a very handy tool for taking the roughing cuts off type-high bodies which have been cast up solid, as it will plane metal equally as well as wood.

Catalogue and Treatise on Photo-Engraving.

repeated again. This painting out or staging allows great latitude in dealing with a plate and liberty in improving on a bad original. When the proof shows a satisfactory result it can then be handed over to the engraver to have all spots picked out or color burnished in where it has been lost. If the plate is to be vignetted the engraver marks out the vignette and the plate is routed previous to running down the edges. The engraver likewise outlines the ovals or any unusual or irregular shape that cannot be handled on the beveling machine. From now on the plate will be dealt with by machinery in preparing it for the printing press and in the last decade quite a number of ingenious labor-saving machines have been constructed so that the increased output could be handled with certainty and ease.

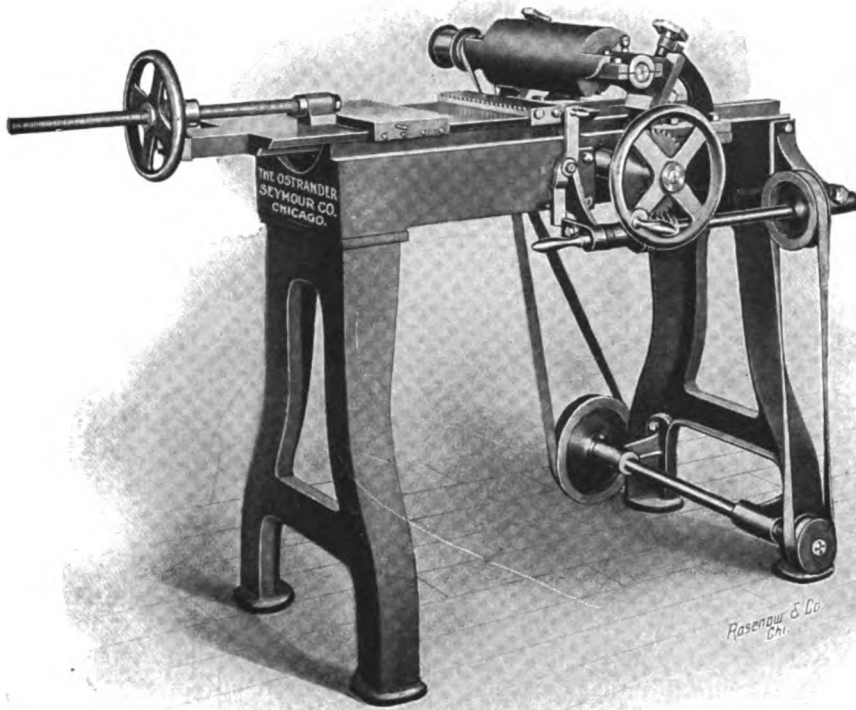
To insure rapidity of execution and output as well as finished and workmanlike appearance to a cut, first-class machinery is a necessity in the final stages of finishing and mounting or blocking the engraved plate.

The great desideratum in this class of machinery is mathematical accuracy, for it is apparent that inaccurate or uneven work in finishing and mounting the cut will result in a slovenly and uneven appearance in the printing, thereby destroying what was up to this point an excellent plate. Where large quantities of line work is done the routing machine is the most important in the establishment. Its purpose is to save deep etching by the cutting away of large white spaces and thus saves the possibility of undercutting the line that would be risked if the plate had to be etched right down to insure sufficient depth in the larger spaces. The accuracy of the modern routing machine is such that little trimming, if any, is necessary to the lines after routing. This machine is also used in routing round ovals, circles, outlined or vignetted half-tone plates, though it should be mentioned that tools suitable for zinc are not suitable for copper, this metal being a much closer and finer grained metal and therefore harder to cut through. If a routing machine is to be used exclusively for copper it is well to speed it much higher than when used for zinc only. The manufacturers of these machines give all necessary instructions regarding their use, care and adaptability.

Up till a few years ago the bevel of all square half-tones used to be done on the routing machine, it being very slow and not as even and finished in appearance as that done with the beveling machine, which, while cutting a margin and rabbeted edge around the plate, leaves at the same time a border for tacking the plate on the block, and a bearer for proving with a frisket in case the need arises of doing so before the plate is blocked. Many large establishments prove, as it is called, on the flat.

Without doubt the most serviceable machine in an engraving shop is the circular saw. It can be used for sawing wood, copper, zinc and the thick metal bases that newspaper cuts are mounted on; though it is advisable to keep separate saws for wood and metal. The table of the saw

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Our New "Ti-Pi" Planer.

No. 1—Size of Table, 12 x 18".

Floor Space, 3 x 4 ft.

Weight, boxed, 1,100 lbs.

This machine is especially designed for making the printing plate, when blocked on wood, absolutely type-high, and is one of the most essential machines to every engraving or electrotyping plant. The cutter head is similar to a surfacing machine, and the block when run through is absolutely type-high and perfectly true, with an excellent smooth finish. A boy can operate the machine without experience, and your plate is then perfectly blocked. Every engraver and printer knows fully the importance of this and further details are, we believe, unnecessary.

Catalogue and Treatise on Photo-Engraving.

should be of iron and made so that it can be raised or lowered by means of a screw, and it should also be provided with gauges.

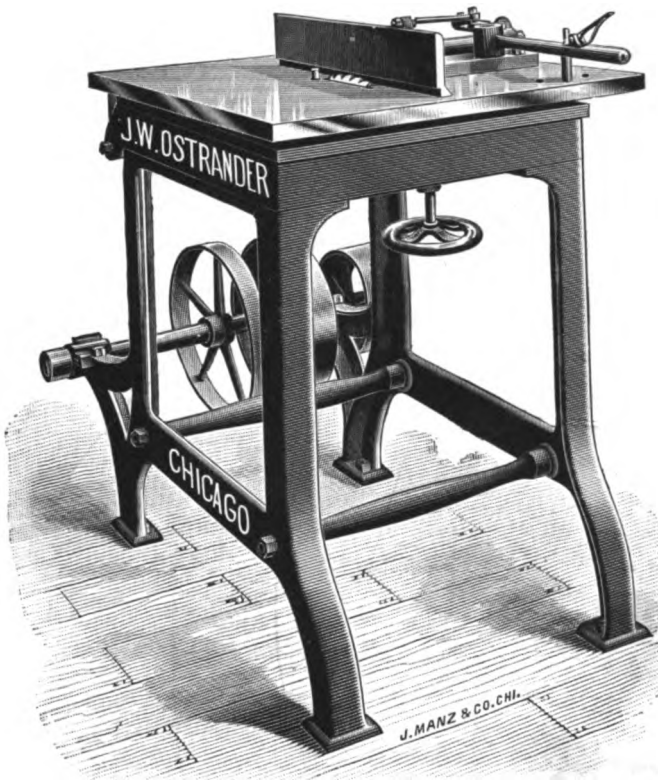
After the cut has been routed or beveled it is mounted, and then sawed as square and close as possible, but to make it more exact and give a finished appearance the sides are planed. This is done in small shops with a shoot-board and plane which consists of a level iron plate with a groove on one side in which a heavy iron plane slides. At one end of the plate there is a cross strip at right angles to the plane against which the block is held while the plane is used. But large establishments use a trimmer to square the blocks instead of the above.

This machine is run by power, consequently more work in both accuracy and quantity can be turned out than by the shoot-board and plane. The trimmer consists of a spindle with a head, into which are fitted two knives, the whole revolving at about thirty-five hundred revolutions a minute. At right angles to the knives is a sliding table provided with a gauge. The block is laid on the table, the gauge adjusted, and the whole moved slowly towards the knives, which, running at a high speed, cut smooth and clean, overcoming entirely the trouble that arises when the end grain of a block is planed by hand.

The plate is now ready for proving (if it has not already been done before mounting) and a Washington hand press is the best for that purpose. Good ink and fine coated enamel paper are essential to bring out the best that is in an engraving, with a careful underlay or overlay to ease off the edges or bring up the blacks, according to the nature of the subject.

The foregoing formulas and instructions are the result of the writer's own experience, and can be fully relied upon, and if carefully followed and due attention given to details will yield good results to all who may venture to investigate this most interesting and fascinating of modern industries.

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Dovetailing Machine.

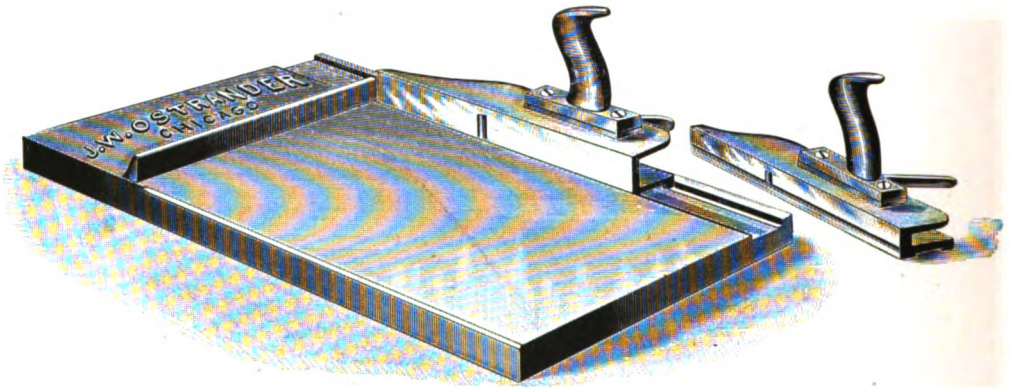
Size of Table 28 x 32".

Floor space, 3 ft. x 4 ft.

Weight, boxed, 900 lbs.

All large and first-class establishments at the present day will not think of sending out a large plate or even one of ordinary size unless mounted on what is known in the trade as an "end-block."

Where many large plates are made this machine is practically indispensable, for end blocks up to any size can be made on it, as it will cut both the mortise and tenant by an easy manipulation of the simple stop-gauge shown at the right-hand side of the machine. The machine pays for itself in a short time, and prevents the delay that usually arises from having to get the blocks made outside.



Shoot-Board and Planes.

No. 1—Size 12 x 18".

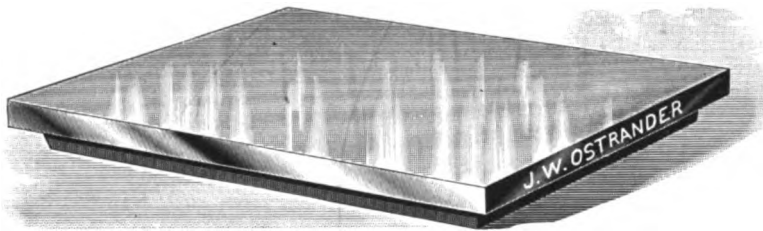
Weight, boxed, 125 lbs.

No. 2—Size 18 x 30".

Weight, boxed, 150 lbs.

A shoot-board and plane are used in establishments where they have no trimmer. It is a very handy tool and does its work admirably. Cuts can be squared up accurately on it, thus given a neat and finished appearance. This machine is undoubtedly used more often than any about your establishment, then why not get the best? Ours is constructed entirely of iron, accurately finished and designed to do the work with greater ease than any we have seen.

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Blocking Slab.

Size, 18 x 24"; weight, boxed, 150 lbs.

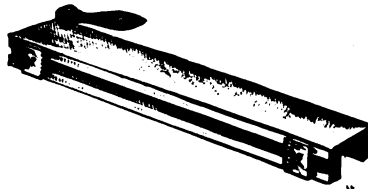
It is necessary, in punching holes in the zinc or copper where the mounting nails are to be driven in, that the bed or surface on which the punching is done should be smooth and unyielding. Our "blocking slab" has a planed and highly finished surface and is a very desirable piece of furniture.



Power Bench Drilling Machine.

Weight, boxed, 150 lbs.

This very handy little machine is especially designed for small concerns and large ones as well, as it may readily be attached to the blocker's bench for drilling and countersinking holes in the plates for screws, nails, making holes for mortises, as well as many other useful purposes.



Line-Holder.

The line-holder is intended for holding small cuts and very thin lines while trimming their sides on the headers. For the workmen to attempt to hold such work in their fingers while trimming them would be very hazardous indeed, and it would be impossible to hold them with a top clamp. With the line-holder they are held by dogs from either end and trimmed with the greatest ease and speed, impossible to attain by any other means of holding. It is not only possible but practical to trim under six point even.

The Ostrander Seymour Co., Chicago, U. S. A.

Machine Tools.



Trimmer Knives for Wood.
Price, each.....\$1.25



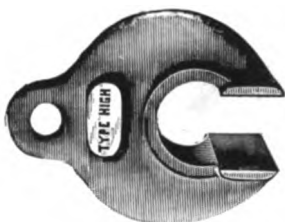
Trimmer Knives for Metal.
Price, each..... .75



Dovetailing Machine Tool.
Price, each..... 2.50



Roughing Machine Knife.
Price, each..... 1.50



Type-High Gauge.
Price, each..... 2.50
Square type-high Blocks, each..... 2.50



Style "A" Cutters.



Style "B" Cutters.

Routing Machine Tools.

Sizes: $\frac{1}{8}$ $\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$
Price, per dozen.....\$3.00



Daniels Planer Knives.
Price, per set of four..... 5.00



Shoot Plane Knives.
Price, each..... 1.25



Engravers' Tools.
6 Engravers' Tools..... 2.50

Rules for Speed.

TO FIND DIAMETER OF PULLEY ON THE MAIN SHAFT.—Multiply the diameter in inches of the receiving pulley of the countershaft by the number of revolutions the countershaft should make, and divide the product by the number of revolutions the main shaft makes.

Example:—The countershaft runs 400, the receiving pulley is $7\frac{1}{2}$ inches in diameter, and the main shaft runs 200. 400 times $7\frac{1}{2}$ equals 3,000, which, divided by 200, equals 15; this is the diameter of pulley on main shaft in inches.

TO FIND DIAMETER OF PULLEY ON COUNTERSHAFT CARRYING BELT TO MACHINE.—Multiply the number of revolutions the machine should make by the diameter of pulley of machine and divide by the number of revolutions the countershaft makes.

Example:—Say machine should make 1,000 revolutions, the diameter of pulley on machine being 6 inches, and the countershaft making 400 revolutions, then multiplying 1,000 by 6 equals 6,000; dividing this by 400 gives 15, which should be the diameter of pulley carrying belt from countershaft to machine.

TO FIND SPEED OF A MACHINE.—Multiply the number of revolutions of the main shaft by the diameter of pulley in inches, and divide by the diameter of receiving pulley of the countershaft. The result is speed of countershaft. Then multiply the number of revolutions of countershaft by diameter of transmitting pulley, and divide by diameter of pulley on machine. The result will be speed of machine. It should be well understood that no other pulleys but those in contact with one belt should be considered.

TO FIND THE HORSE POWER A BELT WILL SAFELY TRANSMIT.—Multiply diameter of pulley in inches by its revolutions per minute and the product by width of belt in inches. Divide this product by 3,300 for single belting or 2,100 for double belting, and the quotient will be the horse power that can be safely transmitted.

TO FIND THE LENGTH OF THE BELT.—Add the diameters of the two pulleys, divide by 2 and multiply by 3.1416. To this add twice the distance between centers of pulleys. This is practically correct where pulleys are not very different in size, and are to run with short belt.

A belt velocity of 2,600 feet per minute is said to give the best results. All belts should run as nearly horizontal as possible.

To find circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

To find surface of a ball multiply square of diameter by 3.1416.

To find side of an equal square multiply diameter by .8862.

To find cubic inches in a ball multiply cube of diameter by .5236.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U. S. standard) weighs $8\frac{1}{8}$ lbs. and contains 231 cubic inches.

A cubic foot of water contains $7\frac{1}{2}$ gallons, 1728 cubic inches, and weighs $62\frac{1}{2}$ lbs.

The Ostrander Seymour Co., Chicago, U. S. A.

Transmission Tables—Shafting.

Applicable to well supported line shafting from which power is taken at intervals by small or medium sized pulleys. *Not* applicable to prime movers (head shafts), jack shafts, or to line shafts *carrying gears or extra large pulleys*. Such shafts should be from $\frac{1}{4}$ in. to 1 in. larger, according to circumstances, than the sizes given in the tables.

	DOUBLE SAFETY—NUMBER OF REVOLUTIONS PER MINUTE.											
H. P.	50	55	60	70	80	100	125	150	175	200	250	300
1	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1	1 $\frac{1}{8}$	$\frac{7}{8}$	1 $\frac{1}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	1 $\frac{1}{8}$	$\frac{5}{8}$	$\frac{1}{2}$
2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	$\frac{1}{2}$
3	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1	1 $\frac{1}{8}$
4	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
5	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
6	2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
7	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
8	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
9	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
10	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
11	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
12	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
13	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
14	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
15	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
16	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
17	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
18	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
20	3 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
25	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
30	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{1}{8}$
35	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$

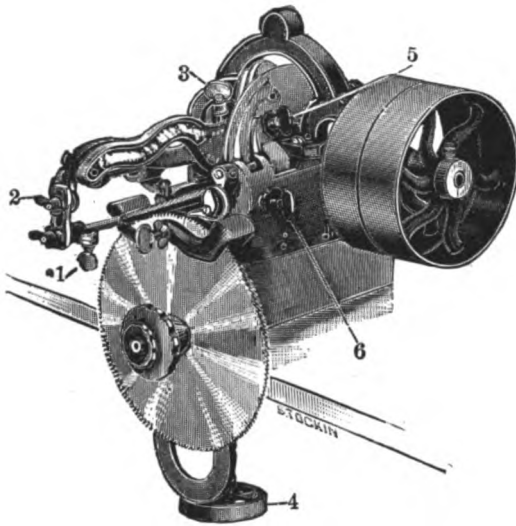
Thicknesses of Sheet Metal—Stub's Gauge.



Approximate weights of 1 sq. ft. of copper and zinc, of different gauges.

COPPER.		HARD ZINC.			SOFT ZINC.		
Stub's Gauge.	Weight in Ounces.	American Zinc Gauge	Stub's Gauge.	Weight in Pounds.	American Zinc Gauge.	Stub's Gauge.	Weight in Pounds.
19	32	....	....	....	....	....	....
18	40	17	18	1.87	17	18	1.67
17	46	19	17	2.25	19	17	2.07
16	48	$19\frac{1}{2}$	16	2.44	$19\frac{1}{2}$	16	2.24
15	56	20	15	2.62	20	15	2.39
14	64	21	14	3.00	21	14	2.76
13	70	22	13	3.37	22	13	3.10
12	81	23	12	3.75	23	12	3.45
11	84	24	11	4.70	24	11	4.30
10	100	....	....	....	....	....	....
9	110	....	....	....	....	....	....
8	123	....	....	....	....	....	....
7	134	....	....	....	....	....	....
6	151	....	....	....	....	....	....

THIS IS WHAT YOU NEED



Circular-Saw Filing-Machine

Will Keep Saws Perfectly Round.

This is a point which will be greatly appreciated, especially by METAL WORKERS, as it is well known that saws cannot be filed perfectly round by hand filing.

Our machine is adapted only to file saws straight across the teeth, and will take teeth only to $\frac{1}{2}$ inch in length, such as can be covered by an ordinary taper file.

IT WILL TAKE SAWS FROM 4 INCHES TO 16 INCHES IN DIAMETER.

It is perfect in its movement, and saws are easily and quickly put in.

D I R E C T I O N S :

Put blocks under the base of the machine, sufficient to raise it well above the bench, so as to be able to see the work readily without stooping. Secure these to the bench and screw the machine to them. In operation the pulley should turn from you; the speed 100 revolutions a minute. A little more will do no harm.

Insert the shank of the file in the rear bearing; place the point in the receiver, which is shaped to fit the taper; drive it back gently by tapping the end of the receiver to make it Absolutely Tight. The file can be raised or lowered by means of thumb-screws 2 and 3. See that it runs level across the vise and sufficiently above it to clear, otherwise a gap will be made in the vise which will stop the pawl in its course and most likely break something. Cant the file to fit the shape of the tooth, turn the pulley by hand to see that the adjustment is correct; then make secure by means of the thumb-screw 1.

The teeth of saws which have been fitted by hand, if irregular, should be regulated before the machine can do perfect work. **WHEN ONCE IN ORDER THE MACHINE WILL KEEP THEM SO.**

The cone will fit any size arbor hole. Saw may be raised or lowered so as to get just the right touch of the file by means of hand wheel 4.

To adjust the throw of the pawl to carry the tooth to the right point for different sizes of teeth, use thumb-screw and set-nut 5. Both thumb-screw and set-nut are necessary in order to secure it firmly so that its movement will not vary in order that the teeth may be properly filed.

This is used for different lengths of teeth. The pawl should draw back about the distance of $1\frac{1}{2}$ teeth.

To regulate the feeding device, use thumb-screw and set-nut 6.

THE LIGHTER THE SAW IS FILED, being sure that the file touches both root and point of teeth, the better the work will be. Of course it will be understood that if teeth of saw are not cut to exactly fit the file, the saw must be run around several times before it will get the right shape.

The file descending on an angle will be found to give rather more of a hook on the tooth than is usually cut in new saws, IF THE FILE IS CANTED WITH THAT OBJECT IN VIEW. This is considered a very important point in the cut of the saw. Remember, that too hard filing raises a burr, which should be avoided, as it is detrimental to the work.

.. NOTES ..

*We intelligently employ sufficient metal for every demand,
and as industriously avoid indiscriminate accumulations.*

**MERIT IS NOT
GOVERNED
BY WEIGHT**

*Each machine is delivered F. O. B. cars at our factory,
Chicago, Illinois, properly skidded and parts boxed.*

*A countershaft, with hangers thereto and pulleys (including
tight and loose) thereon, is furnished with and considered
a part of each machine, where necessary.*

*Each and every machine is set up and operated by competent
experts before shipment.*

*Floor plans, belting arrangements, special details and prices
upon application.*

We have continued the production of desirable tools with a

**POWERFUL
PERSISTENT
PURPOSE**

until competition on lines of merit is unknown to us.

SUPPLY DEPARTMENT

Please Note.



It is our belief that this complete catalogue of modern photographic apparatus and supplies excels anything ever attempted in this line. It is an encyclopedia of modern photographic appliances. We include such of the old line goods as continue to be in demand, and introduce apparatus of recent model and manufacture which we are confident will fully meet all that is claimed for it.

While we quote a large line of apparatus, novelties and supplies, your work might suggest some photographic requisite not listed; write us and it will be promptly supplied if obtainable in the American or European market.

In our descriptive matter great care has been taken to cover all points fully; no expense has been spared in our illustrations, they portray accurately the various apparatus and show minute detail, giving the purchaser the advantage of forming an accurate idea as to the general construction of the goods.

Our special series of lenses—made for us—under tested formulae to meet all requirements in their respective fields—are absolutely the very best value ever offered.

Our cameras, stands, attachments and general apparatus are modern in every particular. We have from the cheapest that's good to the very best that's made.

DO NOT MUTILATE THIS CATALOGUE—Save it as a reference from which to order your goods.

It is not necessary to "cut out" the illustration—order what you want by name or number as listed in this book, and if you think your order is not clear, mention number of page. Write as plainly and definitely as you can. Write only on one side of paper and avoid the possibility of our overlooking any part of your correspondence.

Always state how to ship—freight or express, and mention route preferred.

As prices of all kinds of goods fluctuate, this catalogue gives merely their value at date of issue, and prices may change without notice.

We pack with the utmost care, but we cannot be accountable for breakage in transportation.

New customers, seeking to establish a line of credit, will avoid delay by sending their references with order.

When goods are to be sent by mail, amount of postage must accompany remittance, and packages so sent are at purchaser's risk.

The constant increase in the volume of our business in this line is an assurance that our efforts to satisfy our customers are appreciated by a large number, and we shall continue to give special attention to their wishes for prompt shipments.

With thanks for past favors, we trust that we may meet the requirements of our customers in the future.

Yours faithfully,

THE OSTRANDER SEYMOUR COMPANY.

The Ostrander Seymour Co., Chicago, U. S. A.

Dallmeyer Rapid Rectilinear Lenses.

(PATENT)

This is emphatically "The Lens" for the photo-engraver. It is composed of two exactly symmetrical cemented combinations, and unlike most existing double combination cemented lenses, requiring small



stops to cure the inherent excessive spherical aberration, the Rapid Rectilinear is aplanatic, *i. e.*, it works with the full opening. For copying and enlarging this lens is unrivaled. It will be found unsurpassed for producing the finest results for every variety of photo-mechanical work. With smaller stops each lens covers the next larger, or even two sizes larger plates than those recorded, thus embracing angles of pictures from sixty to eighty degrees, and this without any trace of flare or central spot. Each lens is supplied with a set of Waterhouse Diaphragms. If required,

any of the lenses marked below can be used, with smaller stops, for the next size larger view.

N. B.—It is recommended that all Rapid Rectilinear Lenses above the 10 x 12 size should always be focused with a medium stop (No. 3), whether the picture is to be afterwards taken with a larger or smaller stop. Each lens is constructed to give the greatest possible "depth of focus" which involves the above conditions.

The Dallmeyer Rapid Rectilinear has long been recognized as the lens par excellence for photo-reproduction, and will to-day be found in all establishments where the highest grade of work is produced.

Each lens is carefully tested, and its efficiency assured, before it is sent out.

No.	Size of View or Landscape. In.	Size of Group or Portrait. In.	Diameter of Lenses. In.	Back Focus. In.	Equivalent Focus. In.	Price Waterhouse Stops.
1.....	4½ x 3½	3½ x 3½	¾	3½	4	\$ 28.00
2.....	5 x 4	4½ x 3½	1	5½	6	34.00
3.....	6 x 4½	5 x 4	1½	7½	8½	42.00
4.....	8 x 5	6 x 5	1¾	9½	10	48.00
5.....	8½ x 6½	6 x 5	1½	10½	11	53.00
6.....	10 x 8	8½ x 6½	1¾	12½	13	68.00
7.....	12 x 10	10 x 8	2	15	16	84.00
8.....	15 x 12	12 x 10	2½	18	19½	114.00
9.....	18 x 16	15 x 12	3	23	24½	152.00
10.....	22 x 20	18 x 16	3½	28	30½	206.00
11.....	25 x 21	22 x 20	4	31	33½	252.00

Fitted with Iris Diaphragms larger than 10 x 8, to order only.

The Dallmeyer Stigmatic Lens.

SERIES II F/6.

This is a new universal lens of more simple construction than Series I., consisting of 5 lenses only. It is intended to be a lens suitable for enlarging, reducing, copying and photochromic processes; positively being the quickest stigmatic lens made. At full aperture these lenses cover slightly larger plates than those given, and include an angle along the diagonal of the plates of about 85°.

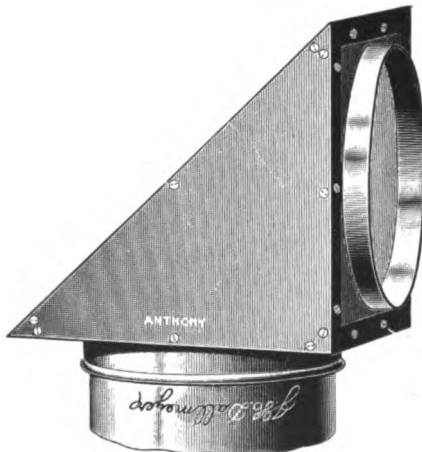
Moreover, being perfectly free from spherical aberration, the full aperture of the lens may be used in focusing, there being no fear of any alteration taking place in the focal length of the lens, when changing the size of the stop, as is the case with many lenses of the Wide-Angle type.

No.	Plate covered at full aperture	Largest plate covered at	Diameter of Lens.	Eq. Focus.	Price with Waterhouse Diaphragms.
	F-6	F-16	In.	In.	
1.....	3½ x 3½.....	4½ x 6½.....	.8.....	4.5.....	\$ 38.00
2.....	3½ x 4½.....	5 x 8.....	.9.....	5.3.....	46.00
3.....	4 x 5.....	6½ x 8½.....	1.1.....	6.4.....	54.00
4.....	4½ x 6½.....	8 x 10.....	1.3.....	7.6.....	65.00
5.....	5 x 8.....	10 x 12.....	1.6.....	9.....	84.00
6.....	6½ x 8½.....	12 x 15.....	1.9.....	10.7.....	108.00
7.....	8 x 10.....	15 x 15.....	2.2.....	12.7.....	148.00
8.....	10 x 12.....	16 x 18.....	2.6.....	15.1.....	196.00
9.....	12 x 15.....	20 x 22.....	3.1.....	18.....	252.00

The Stigmatic Lens we are now enabled to furnish to order, fitted with the old style diaphragm, which enables its adaptation to the photo-mechanical processes. Prices are same as with Iris Diaphragms.

Photographic Prisms.

For Photo-Mechanical Process Work.



Prisms are used to reverse the image formed by the lens from left to right, making it unnecessary to strip and turn the film as is customary in process work, thus effecting a great saving in time and labor, and obviating the danger of the film stretching during manipulations.

Our prisms are made of carefully annealed and colorless glass; they are accurately rectangular, and their hypotenuse surface is silvered, to insure complete reflection, there

being no interference whatever with the sharpness of the image formed by the lens.

The Ostrander Seymour Co., Chicago, U. S. A.

They are mounted so as to be entirely protected by the metal case, which screws directly to the barrel of the lens in such a manner as to bring the non-reflecting surface into close proximity with the front lens, thus securing the greatest angle of the lens and the maximum illumination.

PRICE LIST:

2½-inch	\$30.00	3½-inch	\$65.00
3 "	45.00	4 "	85.00

These prices include mounting and fitting to the lens.

In estimating the size of prism required for a particular lens, a size should be selected which is at least equal to the diameter of the hood. A size which is larger is preferable, as it is of great importance to utilize all the light which the lens can transmit.

Bausch & Lomb-Zeiss Protar F-8.

SERIES II A.



Actual Size

Here the chief aim is to construct a lens combining rapidity and great extent of field.

The speed is $f/8$ which is fast enough for ordinary instantaneous work. The angle of view is 75° of which 60° are utilized on the various plates.

Protar IIa is an unsymmetrical doublet, neither system of which can be used singly, while the separation between the two is sufficient for the application to the smaller sizes of any of our diaphragm shutters.

The definition is excellent, the lens reproducing detail with faultless exactness.

The illumination is ample even under unfavorable conditions and is uniform from center to margin of plate because of the perfect spherical and Anastigmatic corrections.

Series IIa was intended primarily for the hand camera and is suitable for this work because of its neat and compact mounting, short focus, applicability of shutters and excellent optical qualities. It should always be selected for hand cameras when the symmetrical construction is not desired and when a medium wide angle lens is considered necessary. Its focus is shorter than that of other lenses while at the same time its covering capacity is quite equal to that of the rest.

In a studio where space is limited and where good lighting conditions exist, the remarkable depth of focus renders this lens suitable for groups.

Catalogue and Treatise on Photo-Engraving.

It is used by many leading photo-engravers because of faultless detail, flat field and ability to copy straight lines at all angles.

All numbers prove satisfactory for general work, whether for landscape views or instantaneous photography.

Bausch & Lomb-Zeiss Protar—Series IIa

No.	Size of Plate Covered with Stop <i>f</i> -8.* Inches.	Equivalent Focus. Inches.	Diameter of Largest Lens. Inches.	Lens Only.	Fitted with Aluminum Volute Shutter.
1.....	4 x 5.....	4 $\frac{1}{2}$	$\frac{1}{2}$	\$ 30.00.....	\$ 47.00
2.....	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	5 $\frac{1}{2}$	$\frac{3}{4}$	33.50.....	50.50
3.....	5 x 8.....	6 $\frac{1}{2}$	1.....	44.00.....	61.00
4.....	6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	8.....	1 $\frac{3}{8}$	54.50.....	71.50
5.....	8 x 10.....	9 $\frac{1}{2}$	1 $\frac{7}{8}$	64.50.....	83.00
6.....	10 x 12.....	11 $\frac{1}{2}$	1 $\frac{3}{4}$	85.50.....	104.00
7.....	11 x 14.....	13 $\frac{1}{2}$	2.....	125.50.....	145.50
8.....	14 x 17.....	17.....	2 $\frac{3}{4}$	160.50.....	180.50

*The next larger plate is well covered with small stop.

Bausch & Lomb-Zeiss Tessar F-6.3

SERIES II B.



Actual Size

Tessar, like all the other Zeiss series, possesses characteristics which guarantee it a unique position among photographic lenses of the highest quality and perfection. Like all the others, also, its claims upon the attention and admiration of the photographic public, both amateur and professional, are based upon merits which years of experiment have now fully demonstrated. It is with the knowledge that Tessar is possessed of qualities which make it, in some respects, superior to all other lenses, that we now announce our readiness to supply this latest product of optical computations.

CONSTRUCTION.

Simplicity—Tessar is an unsymmetrical doublet of four very thin lenses made of a new type of Jena glass manufactured especially for this purpose. The front lens is uncemented, the two elements being divided by a very appreciable air space. The rear lens is cemented. The front and rear combinations are separated sufficiently to allow the Volute or Iris Diaphragm shutters to be properly fitted. Tessar construction is essentially characterized by simplicity.

Compactness—Tessar is light and compact, and hence particularly suitable for use with the hand camera. The actual size of the 4 x 5 Tessar is shown in the illustration.

The Ostrander Seymour Co., Chicago, U. S. A.

Definition—Here Tessar stands supreme. The image possesses a sharpness and crispness not previously thought of in connection with such great aperture and rapidity. The corrections are perfect, the accuracy and precision of the image extending over a field of great angular area.

Illumination—Because of the small number of lenses, Tessar gathers a marvelously strong beam of light and transmits it with undiminished intensity. The illumination is characterized by unusual uniformity from center to margin of plate.

Rapidity—Because of this unusual light-gathering power a rapidity indicated by f -6.3 is attained. This is sufficient for all kinds of instantaneous photography.

A lens combining such simplicity of construction and such speed with equally uniform illumination and precise definition has never before been placed on the market.

Process Work—The uniform brilliancy and definition characteristic of Tessar make it particularly applicable to industrial and reproductive photography where these two qualities are of such importance. For projection, copying and enlarging Tessar will give satisfactory returns. For process work there is no better lens to be had on the market. It is capable of giving the most precise delineation of objects in half-tone and line engraving. Indeed, its microscopic definition, while working at the large relative aperture of f -6.3, makes it the objective par excellence for half-tone work. We cannot impress the merits of Tessar too highly upon all who are thinking of purchasing new or added equipment for this class of photography.

Three-Color Work—We are manufacturing a special lens known as the Apochromatic Tessar, with a rapidity varying in the members of the series from f -10 to f -15. This lens stands alone in its applicability to three-color printing as it is corrected perfectly for three regions of the spectrum, and thus the photographer is enabled to proceed with his work, substituting one after the other the three ray filters employed in this branch of the art, without varying the size or focus of the image and consequently without the inconvenience of additional focusing and manipulation incidental to the use of lenses not corrected apochromatically. In this field the merits of the Apochromatic Tessar guarantee it a deserved popularity.

AN INCIDENTAL ADVANTAGE.

Attention is called to the fact that another desirable feature is the moderate price for which we are able to place Tessar on the market. This is due to the simplicity of construction, which requires less actual material and less labor than does the complicated manufacture of the average high grade lens.

Catalogue and Treatise on Photo-Engraving.

Bausch & Lomb-Zeiss Tessar—Series IIb.

No.	Size of Plate Covered with Stop f-8.3. Inches.	Equivalent Focus. Inches.	Diameter of Lens. Inches.	Price.	
				Lens Only.	Fitted with Aluminum Volute Shutter.
4	3½ x 4½	5½	1½	\$ 33.50	\$ 50.50
5	4 x 5	6½	1 7/8	40.00	57.00
5a	4½ x 6½	7	1½	49.00	67.50
6	5 x 7	8½	1 7/8	59.50	78.00
7	5 x 8	10	1½	80.50	99.00
8	6½ x 8½	12	2½	118.50	138.00
9	8 x 10	14½	2 7/8	154.00	174.05
10	10 x 12	19½	3 7/8	244.00	
11	12 x 15	23 3/8	3 11/8	314.00	

When ordering lenses fitted with shutter, by telegraph, specify Volute in addition to the size of the lens.

Bausch & Lomb-Zeiss Apochromatic Tessar*—Series VIII.

No.	Extreme size of Plate covered in Reproduction. Inches.	Speed.	Equivalent Focus. Inches.	Diameter of Lens. Inches.	Price.
1	14x17	f-10	18 3/4	2½	\$ 139.50
2	20x24	f-10	25 1/8	2½	227.00
3	28x32	f-10.3	33 7/8	3 3/8	331.50
4	32x36	f-12.5	46 7/8	3½	523.00
5	48x60	f-15	70½	4½	1220.00

*Nos. 1, 2 and 3, working at stop 12.5, and Nos. 4 and 5 working at stop 15, give sufficient precision for half-tone reproduction. Nos. 1, 2 and 3, working at stop 18, and Nos. 4 and 5 working at stop 30, give sufficient precision for engravings.

Bausch & Lomb Photo-Engraving Prisms



These prisms are used to reverse the image formed by the lens, from left to right, thus making it unnecessary to strip and turn the film in process work. They effect a great saving in time and labor, and obviate the danger of stretching or damaging the film during manipulation. Their use does not reduce the sharpness of the image which the lens produces.

Only optical glass of the best quality free from stain and defects is used. The three surfaces are of the highest polish and utmost precision. The silvering of the diagonal surfaces is of the most perfect whiteness and is guaranteed against deterioration.

The metal mount forms a perfect protection to the prism. It is so arranged as to bring lens and prism as close together as possible, thus retaining the greatest effective angle of the objective together with

The Ostrander Seymour Co., Chicago, U. S. A.

maximum illumination and speed. A threaded adapter makes it possible to attach the prism to any photographic lens.

To secure convenience of manipulation we furnish an adapter with revolving collar and clamp, which makes it possible to move the objective, with the prism, on its own axis in any direction and secure it in any desired position.

Figures in the margin show correct size Prism
for Lenses as below.

Full Aperture of Prism. Inches.	Bausch & Lomb-Zeiss Apochr. Tessar. Series VIII.	Bausch & Lomb-Zeiss Protar. Series IIa.	Bausch & Lomb-Zeiss Tessar. Series IIb.	Fitted to B & L-Zeiss Lens.	Price. Fitted to Lenses of other make.
2½	No. 1	No. 6	No. 7	\$ 54.00	\$ 57.00
2½	No. 1			60.00	62.00
3		No. 7	No. 8	90.00	92.00
3½	No. 2	No. 8	No. 9	130.00	132.00
4	No. 3		No. 10	180.00	183.00
4½	No. 4		No. 11	240.00	245.00
5	No. 5			310.00	315.00

In estimating the size of prism which is required for a particular lens, a size should be selected which is at least equal to the diameter of the hood. A size which is larger than this is preferable, but under no circumstances should a smaller one be selected, as, in the work in which these prisms are required, it is of great importance to utilize all the light which the lens can transmit.

LENSES ON APPROVAL.

We send lenses on ten days' approval to responsible parties sending satisfactory references, or will forward lenses for examination and trial in care of the express companies. The purchaser may, if he desires, forward the price of the desired apparatus with his order. The goods will then be sent on ten days' trial, and if not wanted, the amount in full will be returned on receipt of goods uninjured and charges paid.

Series IV. Goerz Double Anastigmat F:11

(U. S. 7,56)

RAPID COPYING LENS.

**For Full Size Reproductions, Enlargements, Large Groups, Landscapes,
Instantaneous Photography and Interiors.**



Series IV of the Double Anastigmatic Lenses has been specially computed for copying in full size. It is, for this purpose, made to cover a plate of a diameter which is double the focal length of the lens without any distortion and without astigmatic aberrations, and with perfectly uniform sharpness up to the extreme edge.

This excellent lens may also be used for photographing distant objects; for in this case the curvature of the image is barely appreciable, and is counterbalanced by the depth of the focus and the sharpness of the image, which is free from

Catalogue and Treatise on Photo-Engraving.

astigmatic aberrations. The sharp image subtends an angle of 75° with the largest stop; hence instantaneous wide-angle photographs, groups, landscapes and architectures may be taken with these lenses. By means of small stops the image may be made to embrace an angle of 90° .

The back lens, the focus of which is about double that of the whole objective, may, in like manner as the lenses of Series III., be used by itself as a landscape lens.

Series IV. Goerz Double Anastigmatic F: 11. (U. S. 7.⁵⁶).

Num-ber.	Equiv- alent Focus. in.	Free Aperture in.	Normal Size of Plate for Copying at F:22 to F:31.		Size of Plate Covered at		Price with Waterhouse Stops.
			In Life Size. in.	In Reduced Size. in.	F:11 for Groups. in.	With Small- er Stops for Landscapes Interiors, etc. in.	
6	12	$1\frac{1}{15}$	16x20	10x12	10x12	16x20	\$ 110.00—
7	14	$1\frac{5}{16}$	20x24	12x16	12x16	20x24	141.50—
7 _a	$16\frac{1}{2}$	$1\frac{1}{4}$	24x28	14x18	14x18	24x28	192.00—
8	19	$1\frac{3}{4}$	28x32	16x20	16x20	28x32	230.00—
9	24	$2\frac{1}{8}$	36x40	20x24	20x24	36x40	345.00—
10	30	$2\frac{3}{4}$	40x48	24x28	24x28	40x48	565.00—
11	35	$3\frac{1}{4}$	48x60	28x32	28x32	48x60	1,096.00—
12	47	$4\frac{5}{16}$	60x80	36x40	36x40	60x80	1,980.00—

The normal plate sizes tabulated above for copying in full size are covered with great uniformity, and with a degree of sharpness which is equal to that of a fine engraving. Where this degree of sharpness is not insisted upon, *e. g.*, for reproductions in mezzo-tint, the same area may be covered with full aperture.

In order to obviate any misunderstanding, we beg to remark that the Double Anastigmatic Lenses F: 11 cover a considerably larger plate than those usually required by photographers. Nearly all cameras now in use are designed for long focus lenses, owing to the inferior capabilities of the older types of copying lenses. For this reason it is often advisable not to choose a lens of inconveniently short focus.

REVERSING PRISMS.

Goerz Prisms—These are accurately rectangular, and the hypotenuse surface is exactly under 45° degrees, and carefully silvered. They are mounted in strong brass fittings, which are carefully adjusted to the front cell, after the removal of the sun shade. Guaranteed perfectly angle true.

The Ostrander Seymour Co., Chicago, U. S. A.



No.	Length of Rectangular Sides. Ins.	Price.
6	1 $\frac{1}{4}$	\$ 50.00
7	1 $\frac{3}{8}$	55.00
7a	2 $\frac{1}{8}$	60.00
8	2 $\frac{1}{4}$	60.00
9	2 $\frac{3}{4}$	75.00
10	3 $\frac{1}{4}$	125.00
11	4 $\frac{1}{2}$	212.00
12	5 $\frac{1}{8}$	375.00

Series III. Goerz Double Anastigmat F:6.⁸

UNIVERSAL EXTRA-RAPID LENS.

For Portraits, Groups, Instantaneous Photography, Landscapes, Architecture, Interiors and Enlargements.



The lenses of this series are universal instruments in the full sense of the word. At full aperture they admit of instantaneous photographs embracing an angle of 70° being taken, even on dull days. By the use of small stops the photograph may be made to include an angle of 90°. The Double Anastigmats of Series III. satisfy, therefore, the highest requirements, and are eminently adapted for all-round purposes, in and out of doors.

As the image is perfectly sharp, even with large apertures, the definition, brilliancy and depth of every point of the field is absolutely uniform. Hence perfectly sharp wide-angle instantaneous photographs may be taken.

The back lens, the focus of which is about double that of the entire objective, may by itself be used as a landscape lens.

NOTE.

The plate sizes specified in the following table are with all the series given in round figures, in conformity with the customary sizes, and do not represent the extreme covering power; considerable margin, in fact, is left for displacing the lens.

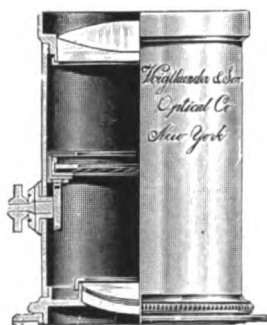
Catalogue and Treatise on Photo-Engraving.

Series III. Goerz Double Anastigmat F: 6.⁸ (U. S. 2.⁹⁰).

No.	Equivalent Focus.	Free Aperture.	Size of Plate Sharply Covered at			Price with Iris Diaphragm.
	In.	In.	F:6.8 In.	F:15.5 In.	F:62 In.	
F:6.8	0000	1 $\frac{1}{2}$	1 $\frac{1}{2}$ x 1 $\frac{1}{2}$	2 x 2	2 x 2 $\frac{1}{2}$	\$ 34.00
	000	2 $\frac{3}{8}$	2 $\frac{3}{8}$ x 2 $\frac{3}{8}$	2 $\frac{1}{2}$ x 3	2 $\frac{1}{2}$ x 3 $\frac{1}{2}$	34.00
	00	3 $\frac{1}{4}$	3 x 3	3 $\frac{1}{4}$ x 4 $\frac{1}{4}$	4 x 5	35.50
	0	4 $\frac{1}{4}$	3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	4 x 5	5 x 7	37.50
	1	6	4 x 5	5 x 7	5 x 8	45.00
	2	7	5 x 7	5 x 8	7 x 9	51.50
	3	8 $\frac{1}{2}$	5 x 8	6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	8 x 10	62.50
	4	9 $\frac{1}{2}$	6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	7 x 9	10 x 12	75.50
	5	10 $\frac{1}{2}$	7 x 9	8 x 10	12 x 15	91.00
	6	12	8 x 10	10 x 12	16 x 18	107.00
F:7.7	7	14	10 x 12	12 x 15	18 x 22	140.00
	7a	16 $\frac{1}{2}$	11 x 14	13 x 17	21 x 25	182.00
	8	19	12 x 15	16 x 18	22 x 25	219.00
	9	24	16 x 18	18 x 22	24 x 30	325.00
	10	30	18 x 22	22 x 25	28 x 36	553.00
	11	35	22 x 25	24 x 30	34 x 44	1,070.00

Voigtlaender's Apochromat Collinear

WORKING APERTURE, F 9
For Three Color and Process Work



The extraordinary demands which modern reproduction methods and in particular the three color process make upon photographic lenses with regard to their chromatic correction, have led us to introduce this entirely new modification of the Collinear type, a construction in which special attention has been paid to the correction of the red, blue and green rays.



In the reproduction of colored originals by the three color process it is customary to photograph the subject successively through a red, a blue and a green screen, and to prepare from these negatives, three plates, the impressions from which, made one over the other by a mechanical printing process, will reproduce the correct coloring of the original. In order that the three impressions may coincide (or register) they must be absolutely uniform in size, which can only be the case if the focal distance for the red, blue and green rays is absolutely identical, and the color correction absolutely correct.

By the use of three special qualities of glass the problem is most accurately solved in the Apochromat Collinear. In this lens the three images, the red, blue and the green, and in fact the images of any other color lie in exactly the same focal plane and are of exactly the same size.

The Ostrander Seymour Co., Chicago, U. S. A.

The green, blue and red plates will coincide with such accuracy that there will be no vestige of overlapping, no color fringe, no lack of sharpness.

The Apochromat Collinear is the only lens of this kind constructed with special reference to these requirements and conditions.

But the Apochromat is also valuable for half tone and line works inasmuch as the absence of the secondary spectrum (color fringes) produces negatives of the most beautiful contrast and exquisite sharpness, and permits of the constant use of the full speed of the lens.

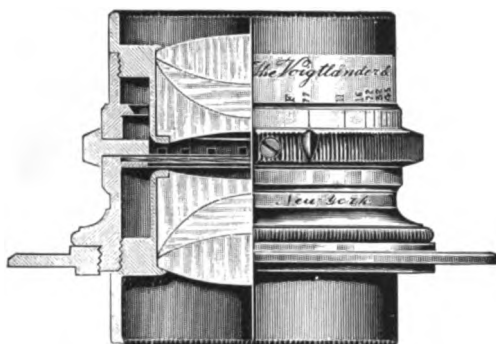
The lenses are regularly furnished with Waterhouse diaphragms. Special diaphragms for half tone will be made to order when wanted.

VOIGTLAENDER'S APOCHROMAT COLLINEAR
Price List and Specifications

Focus Inches	Free Diameter of Glass Inches	Size of Plate Covered		Price
		F 9-11 Inches.	F 16-64 Inches	
12	1½	8x10	10x12	\$112.50
17	1¾	10x12	14x17	181.25
20	2	12x16	16x20	253.75
24	2½	16x20	20x24	326.25
31½	3½	20x24	24x28	543.75

Voigtlaender's Collinears
SERIES III, RAPID.

F 6.8 for Small Sizes—F 7.7 For Large Sizes.



Collinear III is the best "all around" lens—the best lens for a large variety of work. For speedy work alone Series II, having a larger opening, would be better adapted, but when one and the same lens is wanted for everything—groups and instantaneous work, requiring speed; interiors, requiring wide angle; landscapes, re-

quiring depth; architectural, copying and enlarging, requiring sharp definition and a flat field—then Collinear III is the best to choose.

The speed is by no means small; it is sufficient for exposures up to 1/160 of a second, with the most rapid between-lens shutters. When small stops are used Collinear III covers a larger plate and a larger angle and in this manner it is used most successfully as a rapid wide angle lens for interiors, flashlights, etc.

The single combinations can be used alone, as a well corrected tele-photo lens of twice the focus.

The smaller sizes are ideal lenses for hand cameras and pocket cameras (Kodaks, Wenos, Ansco's, Premos, Centuries, etc.).

Catalogue and Treatise on Photo-Engraving.

The middle and larger sizes are exceedingly popular with professionals for view work and large groups.

The sizes Nos. 8-11 are also excellent for half tone engraving—possessing rapidity and sharp definition.

VOIGTLAENDER'S COLLINEARS SERIES III, RAPID

No.	Free Equivalent Diameter of		Sizes of Plates Sharply Covered			Price with Iris Diaphragm
	Focus Inches	Glasses Inches	F 6.8 Inches	F 16 Inches	F 32 Inches	
8	17	2½	14x17	16x18	18x22	\$165.00
9	20	2¾	16x18	18x22	22x27	210.00
10	23½	3¼	18x22	20x24	25x30	300.00
11	31½	4¾	20x24	25x30	30x35	525.00

The back combination of Series III can be used separate, forming an anastigmatic lens with largest aperture of about F 16 and with double the focal length of the complete lens.



Voigtlaender's Prisms

These prisms are made of colorless glass, free from flaws or waves which might deflect the rays of light and produce an incorrect image. They can be fitted to any high grade lens but are made with special reference to the Collinears and Apochromats. They serve to reverse the image as regards right and left.

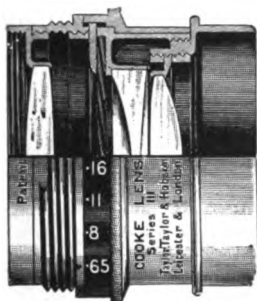
PRICE LIST

No.	Length of Short Side Inches	Suitable for Lenses		Price, including fitting to lens
		Collinear III	Apochromat Focus	
3	1 4-5	No. 5		\$ 32.00
4	2 1-5	No. 6	12 in	50.00
5	2 3-5	No. 7	17 in	60.00
6	3 1-5	No. 8	20 in	80.00
7	3 4-5	No. 9	24 in	120.00
8	4 4-5	No. 10	31½ in	220.00

Note.—When using a lens with a prism it is advisable to choose a lens one size larger than ordinarily required, as the prism narrows the angle of the lens.

The Cooke Process Lens

Construction of Cooke Lens



Iris Diaphragm Mounting

This lens belongs essentially to the class of modern so-called anastigmats, was made possible and had its rise in the remarkable advances which have been made in the production of optical glass by the manufactory at Jena.

The possibility of producing lenses possessing the general powers of the Cooke Lens and other anastigmats has long been known as a matter of theory, but its realization was unattainable before the advent of the new varieties of glass above mentioned.

While the Cooke Lens possesses in the highest possible degree the qualities characteristic of the type of anastigmats, it is essentially unique in construction and very much simpler than any other lens belonging to this class. This simplicity of construction, aside from its merits as such (and simplicity without sacrifice of any valuable quality is always an advantage), affords a variety of incidental advantages in construction, adjustment and in cheapened production.

There being but three simple uncemented elements, separated by an air space, the final corrections for both spherical and chromatic aberrations are attained by merely altering the distances between the elements. Any one familiar with the relations between the curvatures of lenses forming part of an achromatic system, and their distances apart, will recognize at once the enormous advantage which this simple type of construction affords in the possibility of attaining final perfection, and incidentally thereto, the possibility of establishing a very much closer uniformity of performance than can be attained in more complex systems.

The Cooke Lens has a perfectly flat field, and gives microscopic definition at full aperture.

It possesses very great advantages in connection with orthochromatic and three color work in the fact that it is corrected for three regions of the spectrum, and as a consequence the light filters used in the three color process may be successively employed without altering either the size or the focal plane of the image.

The standard threads, flanges and adapters present many advantages. The process series is supplied with a hood of standard thread and size which may be unscrewed and replaced by a prism flange which, when once adjusted, always screws home to the same position. Any prism or mirror suitably mounted can be readily attached to this prism flange.

Catalogue and Treatise on Photo-Engraving.

COOKE PROCESS LENS.

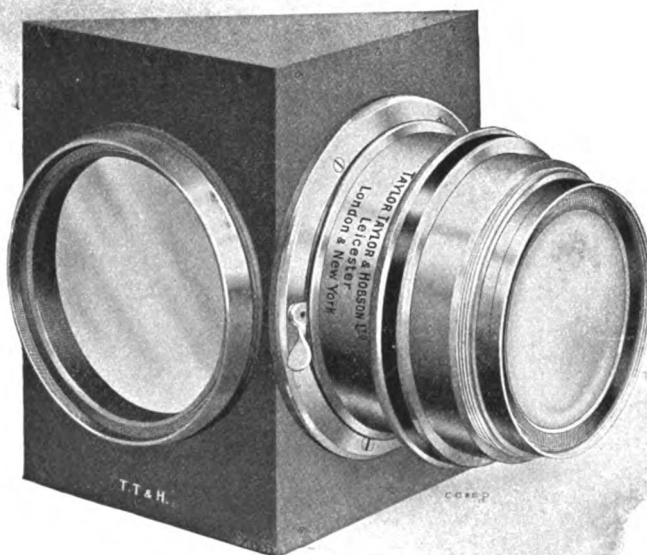
Fitted with Improved Iris Diaphragm and Slit for Waterhouse Stops.

PRICE LIST FEB. 1, 1903. THIS LIST SUPERSEDES ALL OTHERS.

Series V. Full Aperture F/8.

				PRICES.	
Approx. equivalent focus in inches.	With large apertures to cover plates.	When stopped down, to cover plates up to.	Diameter of Standard Screw. Inches.	Diameter of Standard Hood. Inches.	Lens with Iris Diaphragms and Standard Flange
9.....	5 x 8	10x12.....	1.5	1.9.....	\$ 48.00
11.....	6½ x 8½	12x15.....	1.75	2.1.....	67.50
13.....	8 x 10	15x17.....	2	2.5.....	87.00
16.....	10 x 12	16x18.....	2.5	2.8.....	130.00
18.....	12 x 15	20x24.....	3	3.3.....	160.50
25.....	16 x 18	22x26.....	.....	.....	260.00

Discount—10 per cent for cash with order.



COOKE PRISM.

Size of Face. Inches.	For Lens. Inches.	Price.
1½.....	9.....	\$ 49.50
1¾.....	11.....	57.00
2.....	13.....	64.50
2½.....	16.....	99.00
3.....	18.....	129.00
4.....	24.....	198.00

Cut shows Prism attached to Cooke lens.

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DIAPHRAGMS FOR COOKE LENSES.

Diaphragms for Cooke Process Lenses made of vulcanized black sheet rubber are supplied with round, square or irregular apertures and in blank with centres marked.



FIG. 1



FIG. 2



FIG. 3

SET OF FIVE.

Inches.	BLANK (Fig. 1.)	ROUND.	SQUARE (Fig. 2.)	*EXTENSION (Fig. 3.)
9	\$1.33	\$2.00	\$2.70	\$2.70
11	1.50	2.35	3.00	3.60
13	1.70	2.70	3.40	4.00
16	2.00	3.00	3.75	4.50
18	2.25	3.40	4.00	4.80
25	2.70	3.60	4.70	5.25

*Will be made to order with any desired form of aperture at the same price

Gundlach

TURNER-REICH PROCESS LENS SERIES V f-9.



As an optical problem we have taken an interest in producing a perfect lens for photo-engravers. The excellent qualities of our Process Lens will demonstrate that our efforts have been brought to a successful issue. These Lenses show an absolute correction for chromatic and spherical aberrations by which they yield that sharpness of definition demanded by process work. In freedom from Astigmatism and other qualities the process series possesses all the merits of Turner-Reich Anastigmats.

Occasionally we find that our standard lenses do not satisfy the conditions possibly owing to a difference in the chemical action of the plates.

Catalogue and Treatise on Photo-Engraving.

In such cases we are prepared to modify the corrections of the lens, guiding ourselves by test work done by the customer. Satisfaction is guaranteed.

Divested of all mystery and misleading description, a good lens is one which gives an optically correct image when used with a relatively large diaphragm opening. The study of photographic optics teaches the fact that the inherent imperfections found in lenses may be corrected by reducing the size of the diaphragm, so logically, it follows that speed and quality are closely identified.

The number of elements and greater precision demanded in their adjustment, which are required to obtain the corrections in a fine objective, naturally make a perfect lens expensive in comparison with lower grades. Anastigmatic lenses, involving eight or ten elementary lenses, are for this reason more costly than lenses of simple construction, such as the type known as rapid rectilinear, usually composed of four simple lenses.

Rapidity is a term which may only be applied with correctness to lenses giving excellent defining power with a large diaphragm opening and one lens is only faster than another in respect to the value of the diaphragm opening required to yield sharpness to the edge of its light circle.

It is acknowledged by all lens makers that the thickness of the lens or the number of its elements effect the speed to an inappreciable extent which may be entirely disregarded.

A lens is simple or complicated in construction according to the number of individual combinations of which it is composed. The Turner-Reich Anastigmat is composed of ten different elements, but it is of simple structure because these are cemented together in groups of five, making two homogeneous combinations, reducing the reflecting surfaces to the least possible number.

Lenses with air spaces between the combinations are obviously complex, for the reflecting surfaces are thereby multiplied. Every surface reflects a certain amount of light, causing a loss of speed, and such lenses are very liable to give a flare or ghost, and sweat internally. To insure permanent adjustment, they are not usually mounted so these inner surfaces are accessible for cleaning, and they may at any time have to be returned to the manufacturer for this attention.

We hope the foregoing remarks have emphasized the importance of simplicity in lens construction and the evil attending a multiplicity of reflecting surfaces.

A glass surface quickly becomes obscured by a hazy film if not kept well polished, and lenses, unless repeatedly cleaned, will not give a brilliant image. The necessity for a convenient way of reaching all the exposed surfaces is evident. The surfaces of a sealed lens become obscured by condensation, the effect being the same as caused by the film which gathers

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on an exposed lens. Any interruption offered the rays of light passing through a lens causes diffusion, and prevents a perfect focus.

It is impossible for any lens manufacturer to circumvent certain physical laws and so acquire for his lenses a release from the limitations governing lens making. Science may do something in the future to improve existing types, but there are some principles over which opticians have no control, that are as inviolable as the law of gravitation.

In particular we refer to the term rapidity or speed as applied to lenses. Speed is essentially dependent upon the relation of the diameter of the stop to the focal length of the lens and "depth of focus" in a lens is dependent upon the same ratio. Consequently, there is a certain fixed relation between speed and depth of focus, and the former may be increased only at the sacrifice of the latter. When superiority is claimed for a lens in point of speed, by reason of its having a maximum aperture of $f:3.6$, or $f:4.5$, etc., this is misleading, in so far as a sacrifice of depth of focus (the focusing coincidently of objects lying in different planes) thereby unavoidably involved, is not mentioned.

It is our earnest wish to exploit our lenses without using any ridiculous claims, too common by far in lens catalogues and advertisements, which may be questioned by anyone possessing even a superficial knowledge of optics.

We are able to claim that

Turner-Reich and Verastigmat lenses represent the fullest development of optical science in freedom from optical errors,

That they yield the greatest speed consistent with no sacrifice of covering power and other qualities,

That our lenses will respond to the most stringent tests and substantiate our claims to the satisfaction of any competent critic.

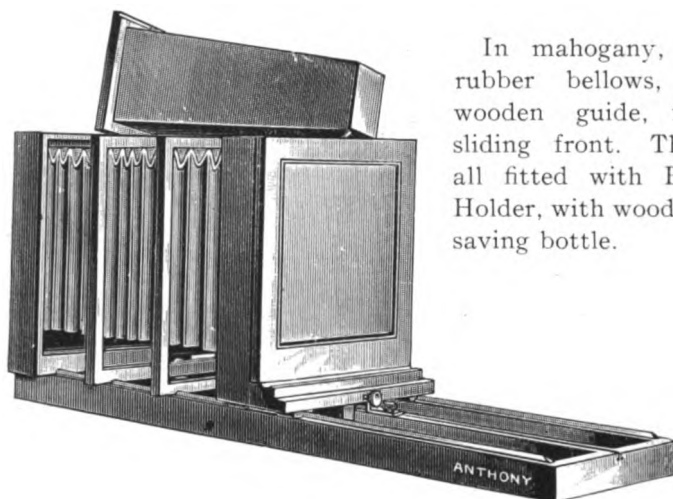
Turner-Reich Process Lens Series V f-9.

No.	Diameter of Lenses Inches	Plate	Focus Inches	Price
1.....	1½.....	10x12.....	14.....	\$ 65.00
2.....	2.....	16x18.....	18.....	125.00
3.....	2½.....	18x22.....	24.....	180.00
4.....	3½.....	22x25.....	30.....	275.00

This lens is in use in many of the largest engraving establishments in the world. If you are in the market, test a Turner-Reich V before you buy.

Catalogue and Treatise on Photo-Engraving.

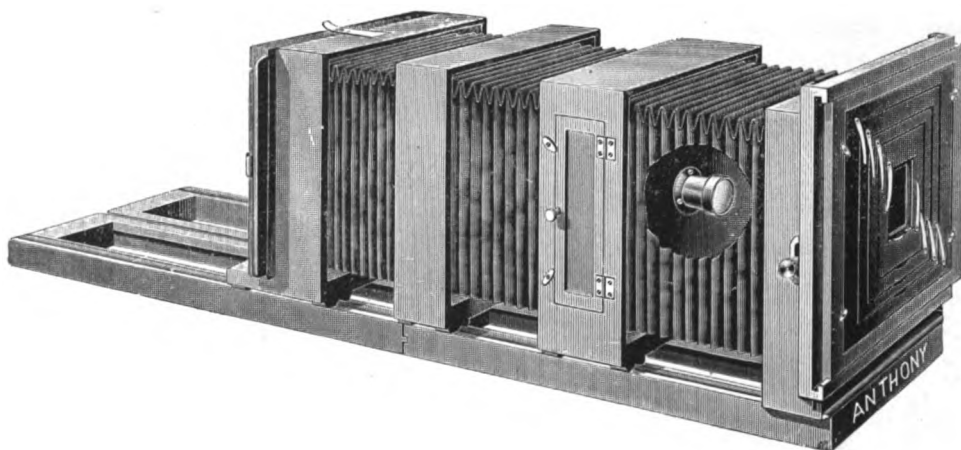
O I C Copying Cameras.



In mahogany, with extra long rubber bellows, cone, improved wooden guide, focus, screw and sliding front. These cameras are all fitted with Benster or Screen Holder, with wooden slide and silver-saving bottle.

No.		Size.	With Benster Holder.	With Lined Screen Holder.	For Line and Half-tone Work.
28	With 3 $\frac{1}{4}$ foot bed	8x10	\$ 33.00	\$ 48.00	\$ 61.00
29	" 4 "	10x12	42.00	58.00	77.25
30	" 4 $\frac{1}{2}$ "	11x14	52.00	71.00	95.50
31	" 5 "	14x17	65.00	85.00	113.00
32	" 6 "	17x20	72.00	92.50	124.50
32 $\frac{1}{2}$	" 7 "	18x22	85.00	107.50	143.00
33	Made to order only	20x24	112.00	122.00	177.50

Climax Enlarging Reducing and Copying Cameras.



The form of construction of this camera is made apparent by the illustration here shown. An important feature in this camera, found in no other, is that the centre-board with lens can be used in the end of the

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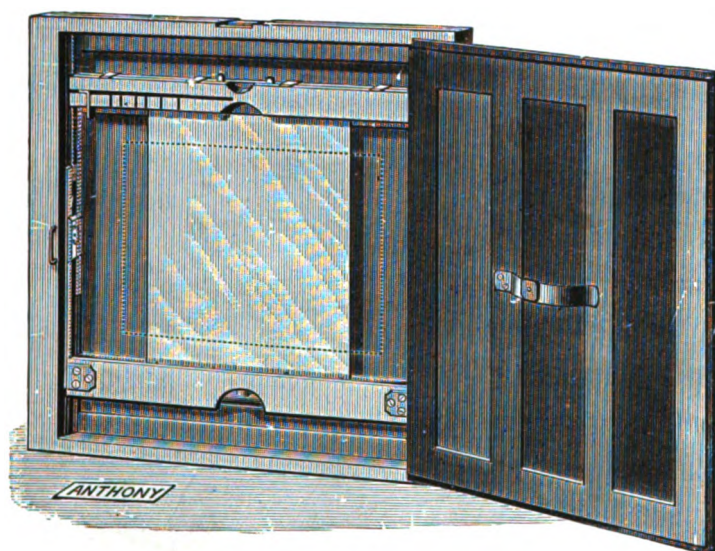
camera, converting it at once into an extra long copying camera. This will be found very advantageous in enlarging small pictures by one operation. These cameras are all fitted with the Benster or Screen Holder, with wooden slide and silver-saving bottle.

			With Benster Holder.	With Lined Screen Holder.	For Line and Half-tone Work.
8x10, With	5½ foot bed		\$ 38.00	\$ 53.00	\$ 66.00
10x12, “	6 “		54.00	70.00	89.25
11x14, “	7 “		65.00	84.00	128.50
14x17, “	8 “		84.00	103.00	132.00
17x20, “	9 “		100.00	120.50	152.50
18x22, “	9 “		110.00	132.50	168.00
20x24, “	10 “		124.00	148.00	189.50

Special sizes and styles made to order.

The “Benster” Plate Holder.

The glass plate rests on a wooden ledge, notched for different-sized plates. As the lower ledge is raised, the upper ledge descends, so that the centre of the plate is at all times in the centre of the holder, no matter



Showing the Holder with Wooden Slide.

what size is used. This obviates the use of inside kits, and adapts itself at once to any size of plate, from the largest the holder will admit, to one not under three inches square. This is unquestionably the best plate holder made for line work. The ledges may be instantly fastened for plates of any size. The plate rests on pure silver wire, and there is a trough with a large bottle underneath, into which all the silver waste readily finds its way.

Catalogue and Treatise on Photo-Engraving.

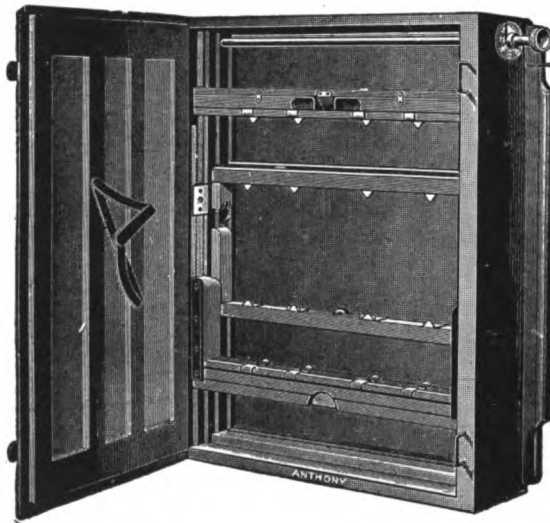
PRICES.

For	8x10	plate and under,	12½ inches wide,	13¼ inches high	.....	\$10.00
"	8x10	"	"	13¼	"	10.00
"	10x12	"	"	15	"	16.00
"	11x14	"	"	17	"	21.00
"	14x17	"	"	20½	"	24.00
"	17x20	"	"	23½	"	27.50
"	18x22	"	"	26	"	30.00
"	20x24	"	"	28	"	35.00
"	22x27,	made to order only	.....			40.00
"	25x30,	"	"			44.00

Special sizes, to order, will cost 20 per cent additional.

Anthony's Improved Patent Lined Screen Holder.

This holder has been constructed to meet the requirements of improved and advanced methods of half-tone negative making. That we have been successful, will readily be demonstrated by attention to the points of advantage given below:



(a) The distance between the screen and negative plate is automatically adjusted from the outside of the holder by turning one knob only.

(b) The mechanism is such that exact parallelism is assured. Being constructed on sound and rigid principles, there is no loose movement between the parts that support the screen and sensitive plates, and both are perfectly secure and remain in place when once adjusted.

The Ostrander Seymour Co., Chicago, U. S. A.

(c) The screen is held securely in position by new devices, without the use of springs, and will hold screens up to $\frac{3}{8}$ of an inch thick, and from 5 in. up to $\frac{3}{8}$ of an inch larger than dimensions given. Thus, a 14x17 holder will take a screen plate 17 $\frac{3}{8}$ in. high by 17 $\frac{1}{4}$ in. wide. The smallest screen accommodated is 5x5 in.

(d) The separating indicator is located on the upper right hand corner in easy reach and view of the operator. The micrometer indicator is divided into thousandths of an inch, and permits a distance from surface to surface of from .025 to $\frac{1}{2}$ an inch, therefore making it practicable for the finest as well as the coarsest ruled plate in use.

(e) All metal parts that might be corroded by the silver solution are kept from contact with it; other parts that are likely to come in contact with the drippings are made of hard rubber and silver. The drippings from the plate are caught in a trough which carries them to a bottle, so preserving the life of the holder and saving the silver solution.

(f) The old-fashioned brass spring on the door for holding the negative plate in position has been abolished, and with our new arrangement bulging of the plate is overcome, making the shape of the half-tone dots appear in their proper proportion.

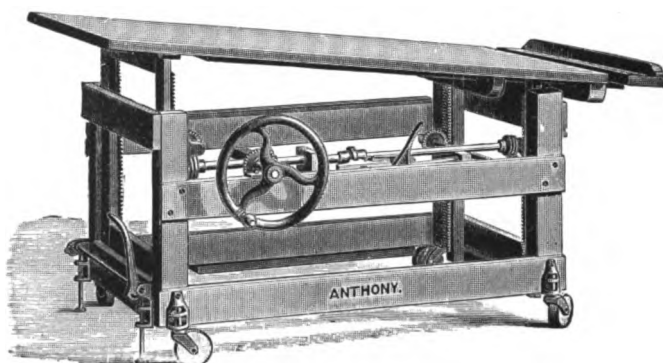
(g) This new construction admits of the focusing being done in the holder with ease and accuracy. A ground glass with a clear circle in the centre, is placed in the position intended for the negative plate. Thus, by focusing through the screen, the actual dot or contrast is easily obtained by turning the indicator. For this manner of operating, the door is hung on the left side and the indicator on the right, making the focusing and adjustment as easy as when using the ordinary ground glass and frame.

Largest Plate.	Outside Dimensions.	Ground Glass and Frame.	Price.
For 8x10.....	12 $\frac{1}{2}$ in. wide, 13 $\frac{3}{8}$ in. high	\$3 00	\$25.00
" 8x10.....	13 $\frac{3}{8}$ " " "	3.00	25.00
" 10x12.....	15 " " "	3.25	32.00
" 11x14.....	17 " " "	3.50	40.00
" 14x17.....	20 $\frac{1}{2}$ " " "	4.00	44.00
" 17x20.....	23 $\frac{1}{2}$ " " "	4.50	48.00
" 18x22.....	26 " " "	5.50	52.50
" 20x24.....	28 " " "	6.50	59.00

CRYSTAL PLATE GROUND GLASS.

	$\frac{1}{2}$ Ground.	1 $\frac{1}{4}$ Inch Clear Circle in Centre.		$\frac{1}{2}$ Ground.	1 $\frac{1}{4}$ Inch Clear Circle in Centre.
8x10.....	\$1.10	\$1.50	17x20.....	\$3.25	\$4.90
10x12.....	1.40	1.80	18x22.....	5.20	5.60
11x14.....	1.80	2.20	20x24.....	6.30	6.70
14x17.....	2.80	3.20			

Catalogue and Treatise on Photo-Engraving.



No. 2.

The No. 2 "New York" Stand is designed to carry larger cameras, and has an extension top. The general mechanism is the same as in the No. 1, and the top may be lowered to a height of only 21 in. It is the ideal studio stand.

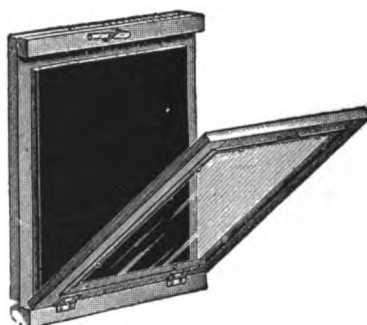
The No. 3 is for still larger cameras, and of the same design as the No. 2.

No. 1, for cameras up to 11x14	\$18.50
No. 2, for cameras, up to 20x24	26.50
No. 3, for larger sizes	38.00

Copy Holder.

With this device, copy that has been rolled or crumpled can be made to lie flat, without mutilating with nails or thumb tacks.

14x17 inches, each.....\$4.50



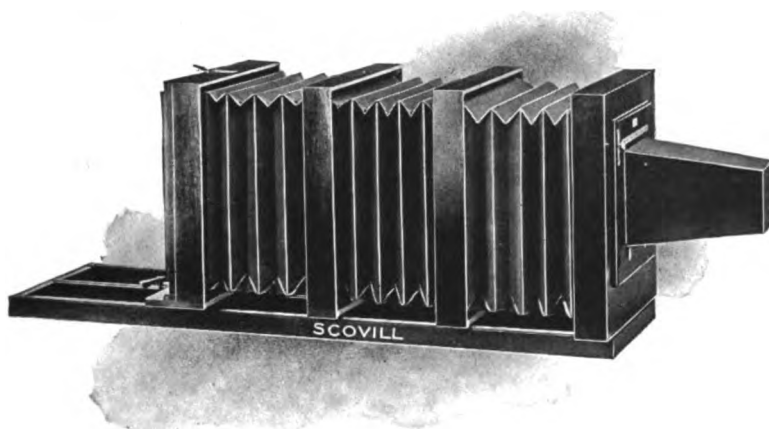
American Optical Co.'s Copying Cameras and Enlarging, Reducing and Copying.

The American Optical Co.'s Copying and Enlarging, Reducing and Copying Cameras have always occupied a unique position. Long before the advent of the process of photo-engraving, photographers were all of one opinion as to the unapproachable quality of the Scovill A. O. Co.'s Copying Cameras.

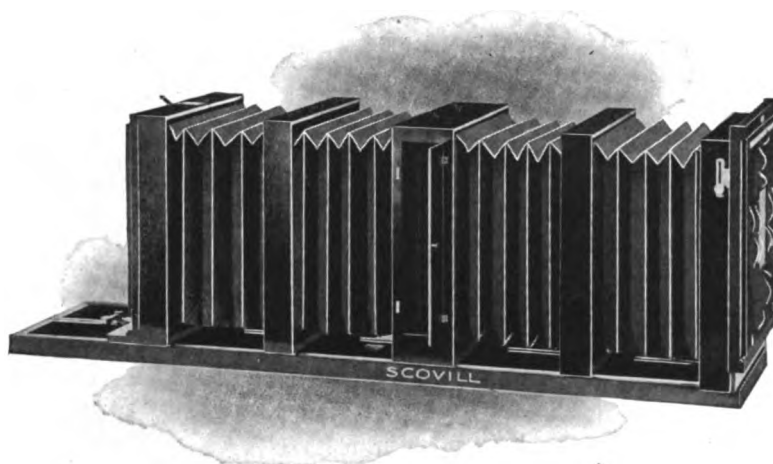
The cameras are made of mahogany, with polished brass trimmings and heavy rubber bellows.

The Ostrander Seymour Co., Chicago, U. S. A.

They are complete in every requisite as supplied regularly, but such varied lengths of bed are required and ordered that we can only give the prices for cameras with the regulation draw.



We make them to order of any size or style desired, with either rigid or detachable bed, and shall be glad to furnish quotations for cameras as desired for any special line of work.



AMERICAN OPTICAL COPYING CAMERAS.

			With Bonanza Holder.	With Scovill-Levy Screen Holder.	For Line and Half-tone Work.
8x10, with	3½	foot bed	\$ 33.00	\$ 48.00	\$ 61.00
10x12, "	4	"	42.00	58.00	77.25
11x14, "	4½	"	52.00	71.00	95.50
14x17, "	5	"	65.00	85.00	103.00
17x20, "	6	"	72.00	92.50	124.50
18x22, "	6½	"	85.00	107.50	143.00
20x24, "	7	"	98.00	122.00	163.50

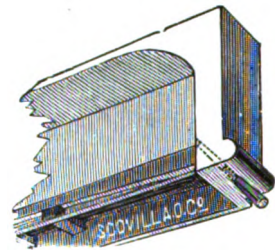
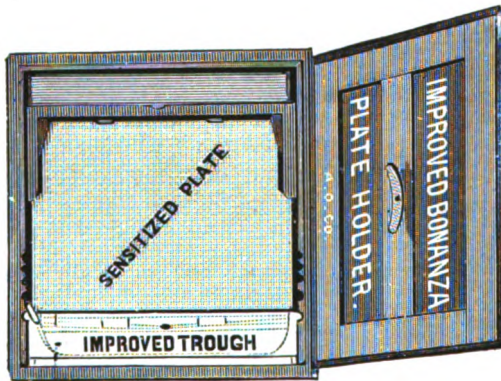
Catalogue and Treatise on Photo-Engraving.

ENLARGING, REDUCING AND COPYING CAMERAS.

		With Bonanza Holder.	With Scovill-Levy Screen Holder.	For Line and Half-tone Work.
8x10, with 5½ foot bed		\$ 38.00	\$ 53.00	\$ 66.00
10x12, " 6 "		54.00	70.00	89.25
11x14, " 7 "		65.00	84.00	108.50
14x17, " 8 "		84.00	103.00	132.00
17x20, " 9 "		100.00	120.50	152.50
18x22, " 9 "		110.00	132.50	168.00
20x24, " 10 "		124.00	148.00	189.50

The Improved Patent Bonanza Plate Holder.

The Photographer's Silver Saver.



Any practical photographer can, by one glance at the illustration, see where the great merit of this holder lies, how perfectly silver solution is saved, and how by the use of grooves the necessity of kits is avoided.

The Plate Holder has now a world-wide reputation, and, because of its great merits, infringements have been attempted.

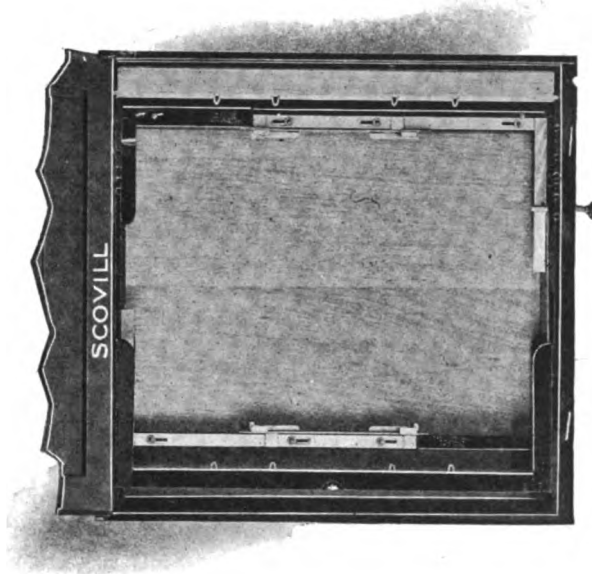
In ordering holders, parties should send their old holder as sample, if possible, to avoid mistakes; otherwise the exact dimensions of old holder should be given.

PRICE LIST OF BONANZA HOLDERS.

8x10	\$10.50	17x20	\$27.50
10x12	16.00	18x22	31.00
11x14	21.50	20x24	35.75
14x17	24.00	25x30	44.00
Bonanza Holder for Cincinnati Camera with Rabbit Kits	12.75		
Bonanza Holder for Multiplying Camera	12.75		
Troughs for Bonanza Holders	1.50		

The Ostrander Seymour Co., Chicago, U. S. A.

The Scovill-Levy Photo-Engravers' Adjustable Screen Plate Holder.



(Patented.)

The principal features of this holder are briefly:

First.—The ease with which it is adjusted for different size plates and screens, by a simple sliding movement of the two inside frames to or from the center, thus dispensing with the expensive and troublesome use of kit frames.

Second.—The convenience by which the screen plate is accurately adjusted to the sensitized plate by means of the metallic sliding adjusters.

Third.—Different thicknesses in the screen plates are allowed for by means of a spring which always holds the plate accurately in place no matter what its thickness may be.

Fourth.—A graduated scale on each screen adjuster makes it easy to insure absolute accuracy in determining the distance of the screen plate from the wet plate.

And, altogether, it is an ingeniously designed and beautifully constructed Holder, which will be found of indispensable aid to the Photo-Engraver.

These Holders are thicker than the ordinary plate holders, and if it is desired to use them on a camera the ground glass of which is focused for the ordinary plate holder, a new ground glass frame is necessary in order to adjust the focus. When ordering a holder to fit a camera in use, send

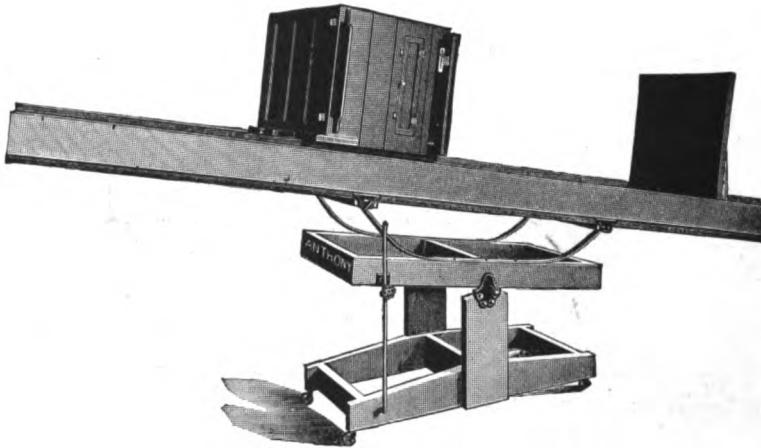
Catalogue and Treatise on Photo-Engraving.

the old holder or the old ground glass frame so that the new ones can be made to fit the camera. Also state the size of largest and smallest screen plate to be used in holder.

It is made in various sizes. Prices as follows:

	Holders Only.	Ground Glass and Frame.
8x10	\$25.00	\$ 3.00
10x12	32.00	3.25
11x14	40 00	3.50
14x17	44.00	4.00
17x20	48.00	4.50
18x22	52.50	5.50
20x24	59.00	6.50

Anthony's Process Camera Stand.



This Stand embraces simplicity, solidity, strength, convenient and easy adjustment.

The bed rests on steel springs, which effectually prevent any vibration, thus permitting negatives to be made perfectly sharp.

By new appliances the entire bed can be tilted, allowing the light to fall on the copy at any angle. By another adjustment the bed of the stand can be moved backward and forward, which enables the operator to get the copy at any distance from the light, without moving the focusing lamps.

Prices include copy board holder.

For 8x10 inch Camera; length of bed, 8 feet	\$15.00
" 10x12 " " " " " 9 "	18.00
" 11x14 " " " " " 10 "	21.00
" 14x17 " " " " " 12 "	24.00
" 17x20 " " " " " 15 "	27.00
" 18x22 " " " " " 18 "	30.00
" 20x24 " " " " " 20 "	36.00

The larger sizes are made with two columns as supports, in place of one as shown in illustration.

The Ostrander Seymour Co., Chicago, U. S. A.

Camera Swing.

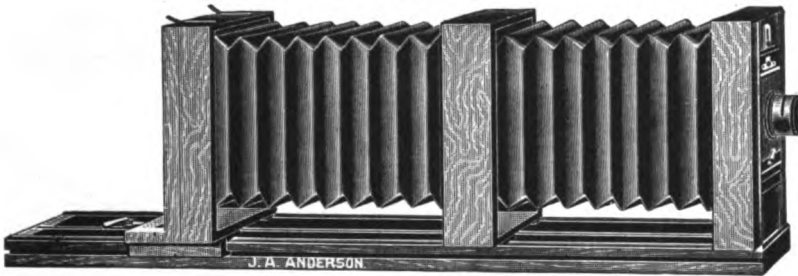
Suspended from the ceiling or cross-beams, overcomes vibration perfectly.

For	8x10 inch Camera; length of bed, 8 feet	\$ 9.00
"	10x12 " " " " 9 "	10.00
"	11x14 " " " " 10 "	12.00
"	14x17 " " " " 12 "	15.00
"	17x20 " " " " 15 "	20.00
"	20x24 " " " " 20 "	25.00

Anderson Process Cameras.

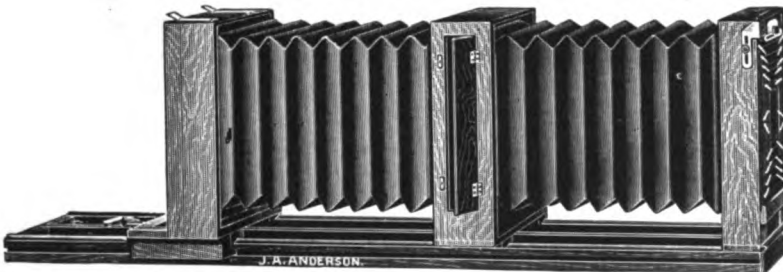
The result of over thirty-five years' experience in the manufacture of photographic apparatus and careful study of the needs of the photo-engraver. Absolutely rigid in the smallest detail, thoroughly well made of best selected, seasoned material, have raising and sliding fronts and all the improvements that strictly up-to-date cameras should have. These cameras were awarded the Gold Medal at the Louisiana Purchase Exposition at St. Louis, 1904.

COPYING CAMERAS.



Size	With holder for line work.	With improved adjustable half tone holder.	For Line and half tone work.
8x10	\$26.25	\$32.80	\$ 41.80
10x12	31.50	39.37	51.37
11x14	38.85	48.56	62.56
14x17	48.33	60.37	78.37
17x20	54.60	68.25	88.25
18x22	63.00	78.74	101.75
20x24	73.50	93.88	119.88

COPYING, ENLARGING AND REDUCING CAMERAS.

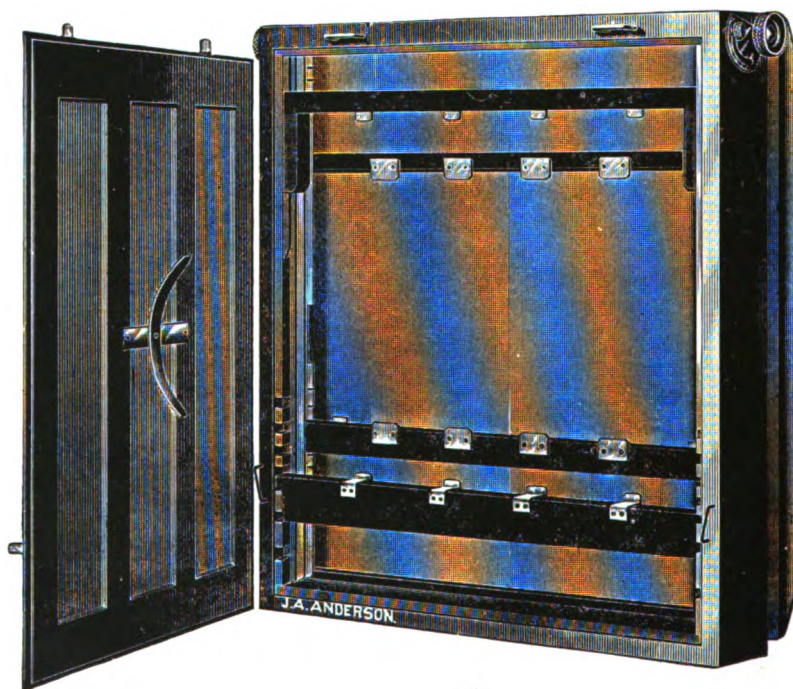


Catalogue and Treatise on Photo-Engraving.

Size	With holder for line work.	With improved, adjustable half tone holder.	For Line and half tone work.
8x10	\$28.85	\$ 36.00	\$ 45.10
10x12	34.66	43.30	55.30
11x14	42.75	53.40	67.40
14x17	53.15	66.40	84.40
17x20	60.05	75.08	95.08
18x22	69.30	86.65	109.65
20x24	80.85	101.06	127.06

Anderson's Adjustable Half-Tone Plate Holder.

The perfection of half tone plateholders. Any size screen and any size plate can be used. The adjustment of the separation is made from the outside of the plateholder by the turning of the thumb-nut, a register showing the degree of separation. Accurate to the highest degree and the screen is always absolutely parallel to the sensitive plate. Fitted to any camera.



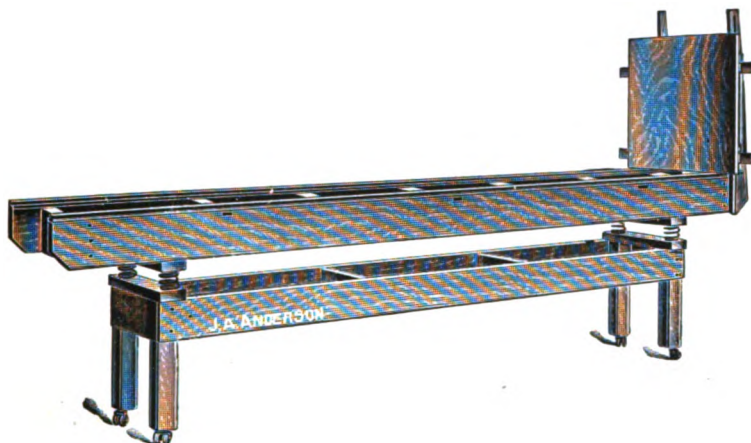
Size.	Price.	Size.	Price.
8x10	\$13.50	17x20	\$30.00
10x12	18.00	18x22	34.50
11x14	21.00	20x24	39.00
14x17	27.00	22x27	45.00

The Ostrander Seymour Co., Chicago, U. S. A.

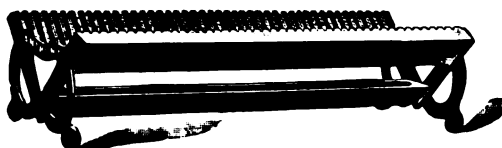
Copying Stands.

Supported on springs to take up vibration. Strongly constructed and occupying the minimum floor space.

Size.	Price.
14x17	\$24.00
17x20	26.75



Brighton Negative Rack.



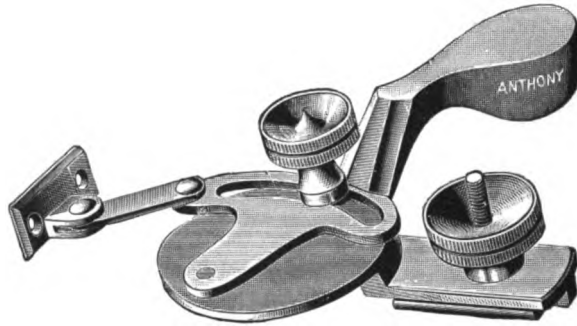
Is a strong, well built rack of large size, for gallery use. It holds 42 negatives, and will accommodate the largest sizes as well as the smaller ones.

Price	\$1 25
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Focusing Lever Complete.

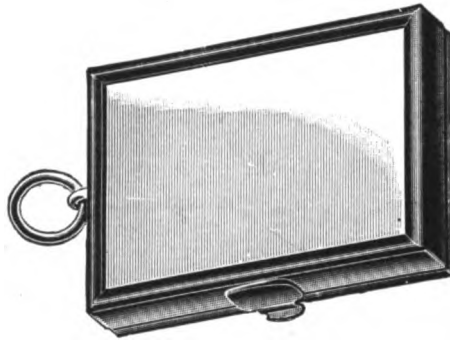
As shown by the cut, this lever is of great assistance in working any large camera box; it renders a perfect adjustment of focus easily obtainable. A general focus is first obtained in the ordinary way; by slight pressure on the lever may be reduced to microscopic sharpness, which, once obtained, may be kept by means of milled binding screw.

Catalogue and Treatise on Photo-Engraving.



Size.	Price.	Size.	Price.
For 8x10 Cameras.....	\$3.50.....	For 17x20 Cameras.....	\$5.00
" 11x14 "	3.50.....	" 18x22 "	5.00
" 14x17 "	5.00.....	" 20x24 "	5.00

Wynne's Infallible Print Meter.



For automatically indicating the correct exposure required for printing on zinc or copper, with absolute accuracy and without any calculation whatever.

Price.....each, \$2.75

Rotary Copy Board. For the Three-Color Process.

The board is provided with a revolving disc, which enables the operator to adjust his copy to different angles with the screen-plate, thus discarding the necessity of making the adjustment by moving the screen plate.

PRICE.

36x36.....each, \$5.00

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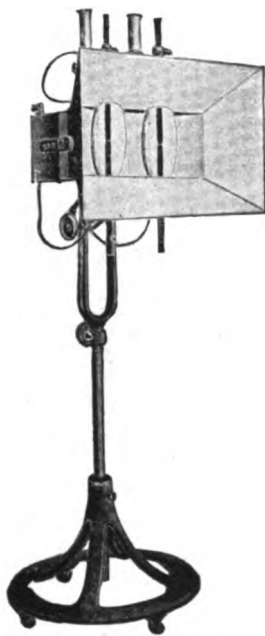
Pine Copy Boards.

Made of selected pine lumber, well seasoned, clamped with dove-tailed battens.

16x20 inches.....	each, \$0.90
18x22 ".....	" 1.00
20x25 ".....	" 1.15
22x31 ".....	" 1.40
25x34 ".....	" 1.80
27x41 ".....	" 2.25

Larger sizes made to order.

Bogue Automatic Focusing Enclosed Arc Lamp.



For Printing



Camera Lamp

The Bogue Enclosed Arc Lamps have entirely superseded the Open Arc Lamps, on account of their economy. They require less than one-half the power necessary to operate the open arc lamps, and reduce the time of exposure fully 25 per cent. These lamps are the latest development in the science of electric arc lighting, emitting a violet (actinic) light—the ideal light; and this light reduces the time of exposure fully 25 per cent. The special construction reduces the amount of current required to produce results superior to any heretofore obtainable. Two Enclosed Arc Lamps, 220 volts, direct current, in series, pass 6 to 8 am-

Catalogue and Treatise on Photo-Engraving

peres, as against 25 to 30 amperes used in the old style Open Arc Lamps. Exactly the same saving is made on Automatic Enclosed Arc Lamps, 110 volts, direct current, and 52 and 104 volts, alternating current, in multiple. Thus one of the greatest expenses of a photo-engraving plant is reduced more than half. In durability and reliability, the Bogue Lamps excel now as they have always done. As one pair of carbons in the Enclosed Arc Lamp will last four days, and one pair is used per day on an open arc lamp there is an important saving in carbons.

The lamps feed automatically at any angle, and are mounted on telescope stands, fitted with ball bearing rollers.

PARTICULARS OF BOGUE ENCLOSED ARC LAMPS.

Prices Include Rheostats.

Bogue Automatic Focusing Enclosed Arc Photo-Engraving Lamp, 110 volts, direct current, in multiple, each	\$50.00
The Same, 220 volts, direct current, in series, each	55.00
The Same, 220 volts, direct current, in multiple, to order only, each	65.00
The Same, 52 or 104 volts, alternating current, in multiple, each	55.00

Bogue Enclosed Arc Double Carbon Printing Lamp.

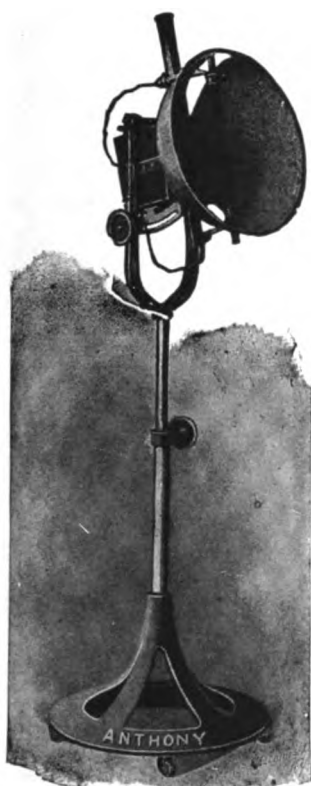
This lamp diffuses a violet (actinic) light over a larger area than any other lamp. It prints in quicker time than any other lamp. Two Bogue Enclosed Arcs are combined in one special large shade, which is lined with asbestos. This shade can be adjusted in all directions. Undoubtedly the best lamp now in use for printing purposes. It has all the economical qualities of the Bogue Focusing Lamps, not the least of which are strength, durability, and constant reliability.

PARTICULARS AND PRICES OF PRINTING LAMPS.

Bogue Double Carbon Automatic Enclosed Arc Photo-Engraving Lamp, direct current, in multiple only, each	\$100.00
The Same, 220 volts, in series only, each	110.00

Carbons for Focusing Lamps.

These are specially selected for the Bogue Lamps, and can be relied on.	
Carbons for Bogue Enclosed Arc Focusing Lamps, per pair	\$0.05
The Same, for Bogue Open Arc Lamps	0.05



Anthony's Automatic Electric Focusing Lamps.

These lamps are made to operate singly or in series, on 110, 220, or 500 volts D. C. incandescent circuits.

The mechanism is simple and rigid, and will not get out of order through ordinary use.

They feed automatically, and burn in any position.

An improved reflector is provided which does not cast shadows.

The lamps are on adjustable standard, with or without rollers.

We guarantee the lamp in every respect, and will send them to any responsible party with the understanding that they may be returned should they not prove as represented.

PRICE LIST.

Direct Current. Automatic Lamps.

20-30 Amperes in Multiple, 110-Volts	\$50.00
20-30 " " Series, 110 "	50.00
20-30 " " Multiple, 220 "	60.00
20-30 " " Series, 220 "	50.00
30-50 " " Multiple, 110 "	60.00
30-50 " " Series, 110 "	60.00
30-50 " " Multiple, 220 "	70.00
30-50 " " Series, 220 "	60.00

Alternating Current. Automatic Lamps.

20-30 Amperes, 52 or 104-Volt	\$60.00
30-50 " " "	70.00

Weight of lamp complete, about 45 lbs.

When ordering lamps, state whether the continuous or alternating system of lighting will be used, together with the voltage of the same, and whether to operate singly or in series.

CARBONS.

Imported, $\frac{1}{8}$ x 12 inch, Cored, per 100	\$5.00
Imported, $\frac{1}{8}$ x 7 inch, Solid, per 100	4.50

The "Violet Ray" Lamp.

It is the Violet Quality of the Ray that Counts.

DESCRIPTION OF LAMP.

The "Violet Ray" Lamp is of the enclosed long burning type of arc lamp.

It will operate on 110 or 220 volt direct or alternating current circuits and requires much less attention and consumes less current than any other engraving lamp on the market.

The lamp is supported on a tripod base with an adjustable arm so that the rays may be thrown in any direction.

Several styles of reflectors can be furnished, but the one shown in the illustration is giving the best results.

A FEW REASONS FOR ITS WONDERFUL POPULARITY.

It produces a rich violet ray.

It reduces length of open arc lamp exposure by one-half.

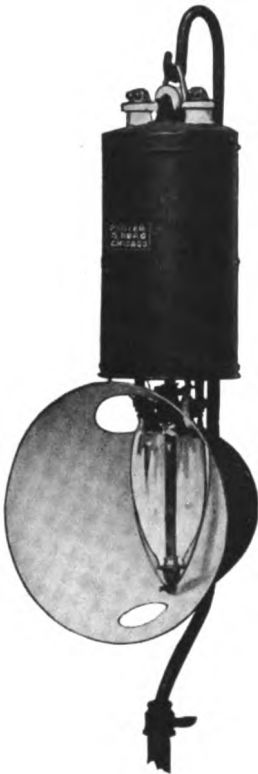
It develops 4,000 nominal candle power.

It is of the long burning enclosed arc type, thus saving carbons and valuable time.

It is economical as regards current consumption.

It costs less than other engraving lamps.

It makes possible rapid exposures and brilliant results.



Lamp only, for direct current circuits of either 110 or 220 volts.....	\$17.50
Lamp only, for alternating current circuits of 110 volts.....	22.50
Stand for either lamp.....	6.00
Reflector for either lamp.....	4.00

Levy Engraved Screens.

The engraved screens have become so well and favorably known that a detailed description seems unnecessary. These are the highest possible attainment in this field, and are characterized by having the opaque lines formed by etching deep into the clear glass and having the lines filled with black pigment, making them perfectly and permanently opaque.

REPAIRING SCREENS.

These engraved screens admit at all times of thorough repair and renovation, so that they may always be maintained as good as new at nominal cost.

SECOND QUALITY PLATES.

In producing the finer rulings some plates are obtained in which there is an excess of the small specks and bubbles inherent in all glass. These defects do not in any way affect the working quality of the screen, and though they are perceptible in the smooth, unbroken tint of the screen, they frequently do not show at all in the resulting work, and where they do so, they are remedied by a touch of the graver in the hands of a finisher. The defects which occur from them in the plates are of utter insignificance compared with those which occur through one or another extraneous source in the chemical manipulation.

These plates are carefully classified, and are sold at 20 to 40 per cent below list prices.

Second quality plates, when in stock, will be sent on approval to any part of the United States to parties remitting to cover cost, or furnishing satisfactory Chicago reference.

Where cash is sent, it will be promptly returned if the plates sent are not found satisfactory. In all cases where plates are sent on approval, intending purchasers must pay express charges both ways if plates are returned.

RULINGS.

In addition to the rulings shown, we can supply a large number of intermediate textures, as follows:

50, 55, *60, *65, *70, *75, *80, *85, *100, 110, *120, 125, *133, 140, *150, 166, *175, *200, 250, 300 and 400 lines per inch.

Those marked with a * are standard rulings, and we generally have a few ruled plates of these textures in stock, but not usually finished; plates of these rulings can always be supplied with greater promptness than those of exceptional textures.

GUARANTEE.

We cannot supply plates that are "absolutely perfect," but every plate of the standard rulings illustrated in this catalogue, and of the standard sizes listed, is guaranteed to be fully satisfactory, and if not so, may be returned within ten days, and any money paid on account of such plates will be refunded on receipt of the plate in good order.

PRICE LIST STANDARD ENGRAVED SCREENS.

Sizes in Inches.	LINES PER INCH.						
	85 or less	100	110 or 120	125 or 133	140 or 150	166 or 175	200
6 x 8	\$ 15.00	\$ 18.00	\$ 20.00	\$ 22.00	\$ 26.00	\$ 32.00	\$ 40.00
6½ x 8½	18.00	20.00	24.00	28.00	32.00	40.00	50.00
7 x 9	24.00	25.00	30.00	36.00	42.00	50.00	65.00
8 x 10	32.00	35.00	42.00	48.00	54.00	68.00	82.00
9 x 11	35.00	40.00	55.00	60.00	70.00	85.00	100.00
10 x 12	40.00	52.00	70.00	80.00	95.00	110.00	130.00
11 x 14	60.00	80.00	98.00	115.00	135.00	160.00	185.00
12 x 15	75.00	100.00	120.00	142.00	170.00	200.00	230.00
13 x 16	95.00	122.00	144.00	172.00	208.00	240.00	280.00
14 x 17	115.00	145.00	168.00	208.00	252.00	280.00	340.00
15 x 18	135.00	170.00	198.00	245.00	300.00	350.00	400.00
16 x 20	166.00	208.00	240.00	305.00	360.00	420.00	500.00
17 x 21	188.00	235.00	270.00	340.00	405.00	475.00	570.00
18 x 22	210.00	265.00	305.00	385.00	455.00	540.00	640.00
20 x 24	255.00	316.00	365.00	460.00	540.00	665.00	.....

The outside dimensions of the screens are one-half inch larger each way than the sizes denoted in the above list. For special screens for color work see Special List.

Catalogue and Treatise on Photo-Engraving.

SUPPLEMENTARY PRICE LIST OF STANDARD ENGRAVED SCREENS.

Sizes in Inches	LINES PER INCH.							
	85 or less	100	110	120	125	133	140	150
21x25	\$275.00	\$345.00	\$390.00	\$400.00	\$490.00	\$500.00	\$580.00	\$590.00
22x26	300.00	375.00	425.00	435.00	530.00	545.00	615.00	630.00
24x28	350.00	435.00	485.00	500.00	610.00	635.00	700.00	725.00
26x30	400.00	495.00	555.00	575.00	690.00	730.00	.....	.....
27x32	440.00	545.00	600.00	625.00	750.00	.....	.....	.....
28x34	485.00	590.00	645.00	685.00	810.00	.....	.....	.....
30x36	540.00	660.00	710.00	765.00	885.00	.....	.....	.....
32x40	640.00	765.00	830.00	.....	.....	.....	.....	.....

Over 1,200 square inches, 85 lines per inch, 50 cents per square inch.

Over 1,200 square inches, 100 lines per inch, 60 cents per square inch.

Trial Sizes:—These sizes were originally prepared to afford workers an opportunity to test the screens with but a moderate outlay, and although the screens are now universally recognized and used, there is such a considerable demand for these sizes that it has been decided to continue them.

Sizes in Inches	LINES PER INCH.							
	85	100	110 or 120	125 or 133	140 or 150	166 or 175	200	
3½x4½	\$ 2.00	\$ 2.00	\$ 2.00	\$ 2.00	\$ 3.00	\$ 5.00	\$ 8.00	
4 x 5	4.00	4.00	4.00	4.00	6.00	8.00	12.00	
4½x6½	6.00	6.00	6.00	6.00	8.00	10.00	16.00	
5 x 7	9.00	9.00	10.00	12.00	14.00	16.00	22.00	
5 x 8	12.00	12.00	12.00	14.00	16.00	20.00	28.00	

Fine Line Screens.

Since our last catalogue, finer rulings than had been hitherto used have met considerable favor for certain special classes of work. A price list of these finer rulings is appended below:

Lines per Inch	SIZES IN INCHES									
	4 x 5	4½ x 6½	5 x 7	5 x 8	6 x 8	6½ x 8½	7 x 9	8 x 10	9 x 11	10 x 12
250	\$20.00	\$30.00	\$40.00	\$ 50.00	\$ 62.00	\$ 75.00	\$ 95.00	\$120.00	\$150.00	\$195.00
300	28.00	42.00	60.00	72.00	85.00	100.00	125.00	160.00	200.00	.....
400	40.00	68.00	90.00	110.00	130.00	150.00	185.00	240.00	.....	.....

Special Screens for Color Work.

An outfit of screens for color work may consist either of one large screen of square or round form, or it may consist of a pair of screens ruled in such a manner, that when they are used successively in the camera the lines cross each other at the proper angles. Each of the pair of screens required for this work is materially smaller than a single screen to make the same size plate, but in view of the fact that screens for this work, either square or round in form, can be ruled with the lines parallel to the sides of the glass, it is found possible to furnish them in the larger sizes at prices relatively so much lower as to bring the cost of the larger square screen down to the cost of the smaller pair that will do the same work.

The Ostrander Seymour Co., Chicago, U. S. A.

While there are some elements of advantage in favor of the use of a smaller pair of screens, experience has shown that in the case of very large or very fine screens there is great danger of introducing a moire or pattern owing to slight variations in the position in which the screens are placed in the holder. This danger can be entirely obviated by turning the screen in the holder through a fixed and predetermined angle.

The sizes and prices of round or square screens are given in the annexed list, together with the cost of a pair of screens of same ruling capable of producing the same size plate. The prices of square screens in the following list apply only to those ruled parallel with the sides of the plate.

PRICE LIST, SPECIAL SCREENS FOR COLOR WORK.

†Sizes in Inches	Lines per Inch 133	Lines per Inch 150	Lines per Inch 166 and 175
Pair, 8x10	\$ 96.00	\$108.00	\$136.00
Square, 13½	96.00	108.00	136.00
Round, 13½	104.00	116.00	144.00
Pair, 9x11	120.00	140.00	170.00
Square, 15	120.00	140.00	170.00
Round, 15	128.00	148.00	178.00
Pair, 10x12	160.00	190.00	220.00
Square, 16½	160.00	190.00	220.00
Round, 16½	170.00	200.00	230.00
Pair, 11x14	230.00	270.00	320.00
Square, 18½	230.00	270.00	320.00
Round, 18½	240.00	280.00	330.00
Pair, 12x15	284.00	340.00	400.00
Square, 20	284.00	340.00	400.00
Round, 20	295.00	351.00	411.00
Pair, 13x16	344.00	416.00	480.00
Square, 21	344.00	416.00	480.00
Round, 21	355.00	427.00	491.00
Pair, 14x17	416.00	504.00	560.00
Square, 22½	416.00	504.00	560.00
Round, 22½	428.00	516.00	572.00
Pair, 15x18	490.00	600.00	700.00
Square, 24	490.00	600.00	700.00
Round, 24	505.00	615.00	715.00
Pair, 16x20	610.00	720.00	840.00
Square, 26	610.00	720.00	840.00
Round, 26	625.00	735.00	855.00
Pair, 17x21	680.00	810.00	950.00
Square, 27½	680.00	810.00	950.00
Round, 27½	697.00	827.00	967.00
Pair, 18x22	770.00	910.00	1,080.00
Square, 29	770.00	910.00	1,080.00
Round, 29	788.00	928.00	1,098.00
Pair, 20x24	920.00	1,080.00	1,330.00
Square, 31½	920.00	1,080.00	1,330.00
Round, 31½	940.00	1,100.00	1,350.00

†Round and square screens are cut exact sizes listed above.

DIAMOND RULED SCREENS.

A New Levy Screen at Fifty Per Cent Reduction.

Pursuant to the demand for screens for exceptional or occasional use at a lower price than our Standard Engraved Screens, we have added to this list a new series of Diamond Ruled Screens. These screens differ from our standard screens in that the lines are not engraved into the glass, but are ruled through an opaque ground with a diamond point. They are produced on the same machines and with the same care in every particular as is bestowed upon the etched screens, but the saving of the laborious process of etching and filling the lines, and the avoidance of the great loss of rulings entailed in these processes enable us to produce these screens at a greatly reduced cost.

The results obtained from the ruled screen are as good as from any screen that can be produced, and they are especially recommended where a screen is required for only occasional use, as well as for very large screens, where the original cost of the engraved screen is often not justified by the amount of service required of it. They are not, however, recommended where constant and hard usage is demanded. The glasses cannot be separated and repaired, as in the case of etched screens, and they are consequently not so durable. These screens will be known as Economic Screens, and designated as Type B.

The price of the Economic Screen is exactly one-half that of the Standard Engraved Screen of the same size and ruling. The same list as applies to the Standard Engraved Screens throughout is employed for these Diamond Ruled Screens, by deducting fifty per cent from the list price.

LEVY ROTARY SCREEN HOLDER.

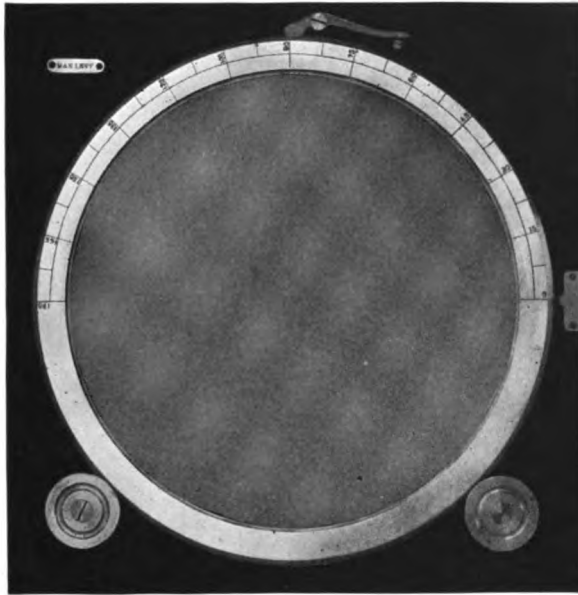
For Color Work of Every Description.

For some time past attention and interest have been centered upon the application of the ruled screen to multi-color work, and a variety of expedients have been employed for the purpose of obtaining the screen rulings at the proper angles. Many of these devices, notably the use of two screens ruled at proper and complementary angles, have been found very serviceable and particularly so for work in three colors.

This system, however, has been found wanting; first, in the fact that it was not sufficiently accurate when applied to either very large plates or very fine rulings, and in the second place, the inflexibility of such a pair of screens limited the applications so that they could not be advantageously employed for either duotype or work in four colors. A number of different devices were from time to time produced for the purpose of rotating a circular screen within the camera or plate holder. As a result of the

The Ostrander Seymour Co., Chicago, U. S. A.

experience gained in this direction, we are finally enabled to offer a device which is confidently felt to meet all the requirements of the situation and to make a single screen equally applicable to any class of work and any number of colors for which such a screen can be employed.



The device is shown in the illustration, and the design has been reduced to the utmost simplicity.

With this arrangement there need be no fear of moire or pattern of any sort. The lines of the screen are set to the zero and the 180 degree marks, and one-half the circle is divided in intervals of $7\frac{1}{2}$ degrees. The construction is such as gives permanency of alignment under all circumstances. The frame can be fitted to any plate-holder or camera. The frame is made of sheet aluminum; the ring and wheels of special aluminum castings from our own formula, giving great rigidity and wearing qualities combined with extreme lightness of weight. The workmanship throughout is of the best character.

This appliance has been supplied to quite a number of three-color workers and has received the heartiest commendation from all. Our aim in the design of this appliance has been the utmost simplicity compatible with efficiency. The device has not been patented and the prices are established on an ordinary commercial basis. The following list for the rotating holders includes the cost of fitting and setting the screen.

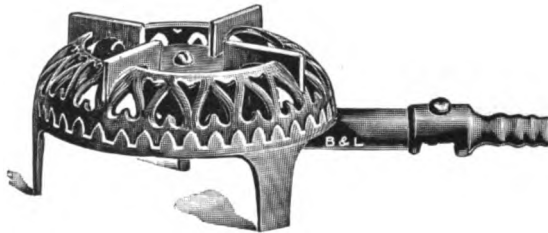
Catalogue and Treatise on Photo-Engraving.

PRICE LIST.

Size of Plate	Diameter of Screen	*Outside Dimensions	Price
8x10.....	13½.....	17 x17	\$30.00
9x11.....	15	19 x19	32.00
10x12.....	16½.....	20 x20	35.00
11x14.....	18½.....	22 x22	38.00
12x15.....	20	24 x24	40.00
13x16.....	21	24½x24½.....	44.00
14x17.....	22½.....	26 x26	50.00
15x18.....	24	28 x28	52.00
16x20.....	26	30 x30	55.00
17x21.....	27½.....	32 x32	60.00
18x22.....	29	36 x36	65.00
20x24.....	31½.....	36 x36	72.00

*These dimensions may be varied to meet special conditions at a slight additional cost.

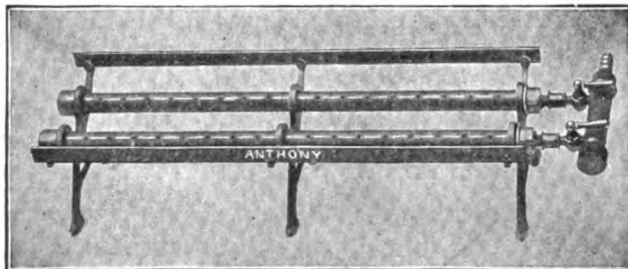
GAS STOVE.



For burning in half tones, drying plates while coating with sensitizing solution, etc. This burner has thirteen central, and fifty-one surrounding jet holes, and ten-inch spread of flame.

Plain iron, each.....\$0.75

GAS FURNACE.



These Furnaces are constructed on the principle of a Bunsen Burner. a great amount of heat being produced with a small expenditure of gas. A support is provided on either side, upon which the plate is allowed to rest while being heated.

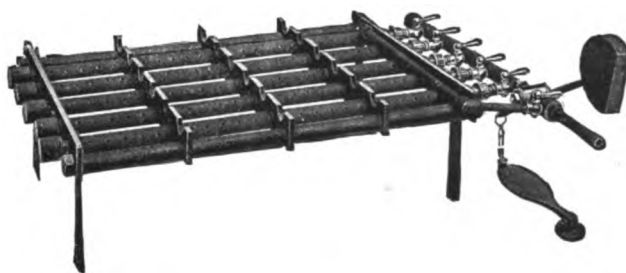
The advantage of this furnace over others, is that any size plate can be burnt in perfectly even, the edges being heated the same as the centre,

The Ostrander Seymour Co., Chicago, U. S. A.

thus overcoming an unequal spread of the powder as is the case with other burners.

Price for heating plates 18 inches wide, with 2 burner pipes\$6.00

GAS FURNACES.



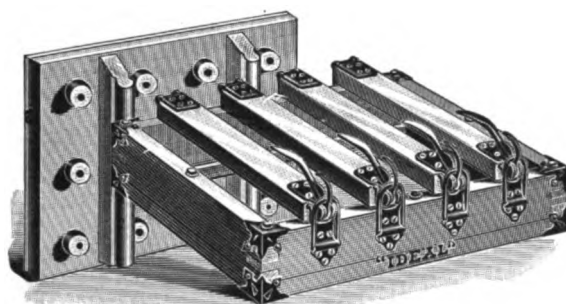
These Furnaces are very substantially built and give intense even distribution of heat. The saving of gas is its principle feature over any other on the market.

10x24 Frame, 3 pipes, pilot light and foot cut-off	\$20.00
18x18 " 5 " " " " " "	25.00
20x24 " 5 " " " " " "	28.00

Without foot cut-off deduct \$2.00. Special sizes and patterns made to order.

Ideal Printing Frames No. 3

The latest improvement in photo-engraving printing frames is embodied in Ideal No. 3, successor to Nos. 1 and 2. The Ideal Frame is the only one on the market with the Rubber Cushion principle, and is patented by its manufacturer. It is the only pressure system yet invented by which great pressure can with comparative safety be imparted to glass, such as is required in contact printing by photo-engravers.



The glass is of special importation and is the finest annealed in the foreign markets. It is economy to fit sizes as small as 14x17 with 1½ plates. We never yet heard of any of these 1½ plates being broken by heat or over pressure.

Catalogue and Treatise on Photo-Engraving.

Both frames and pressure boards are very rigidly and solidly built. The underside of the pressure board is padded with heavy wool felt. The upper side is studded with a suitable number of rubber cushions which the pressure arms come in contact with when brought down and locked in position, resulting in a live uniform pressure, imparted automatically even all over the pressure board and all done in a few seconds of time.

The very fact that the Ideal Printing Frames are now used by two-thirds of the photo-engraving houses in the United States and many of the principle ones in foreign countries is proof of merit and superiority.

Note This, It is Important.—When ordering be very particular and state whether glass is wanted with the frame or not, and also whether shipment is to be made by express or freight. When no glass is ordered, none will be sent, and when no specific shipping directions are given we will use our own judgment about the matter, and hope not to be criticised if not done according to the liking of the customer.

SIZES AND PRICES.

These are standard sizes, which it is aimed to constantly keep in stock, for immediate delivery.				These are special sizes, and are not kept in stock, but will be made to order on short notice.			
Size of Frame.	Price with-out glass	Price with glass	Glass separate	Size of Frame.	Price with-out glass	Price with glass	Glass separate
8x10....	\$11.25....	\$13.25....	\$ 2.25....	9x11....	\$12.00....	\$14.00....	\$ 2.25
10x12....	12.50....	15.00....	2.75....	12x16....	17.00....	20.75....	4.00
11x14....	14.50....	17.50....	3.25....	18x24....	28.50....	36.25....	8.00
12x15....	15.50....	19.00....	3.75....	21x25....	35.00....	48.00....	13.00
14x17....	18.50....	23.00....	4.75....	20x30....	37.00....	50.50....	13.50
15x18....	20.00....	25.00....	5.25....	22x28....	38.00....	52.00....	14.00
16x20....	21.50....	27.25....	6.00....	26x36....	45.00....	64.50....	19.50
18x22....	26.00....	33.25....	7.50....	30x40....	50.00....	75.00....	25.00
20x24....	30.00....	38.25....	8.50....	36x56....	65.00....	107.00....	42.00

Sizes above 20 x 24 are made for 1½ inch thick glass. Wishing smaller sizes fitted with it add 10% to prices of column "Price with Glass."

By the use of a truck one man can print about as easily with a 36x56 Ideal Frame as he could with a 14x17 size and no truck. The frame can be held in any angle or position desired. Besides saving labor they prevent the marring of the frame, and when not in use can be rolled to one side out of the way, keeping the frame away from the floor where an uneven temperature exists. They are adapted to frames 22x28 and up. Price, \$15.00.

The "Perfected" Printing Frame

A NEW DEPARTURE.

The cut represents this well-known Printing Frame (now in its sixth year) in its perfected state.

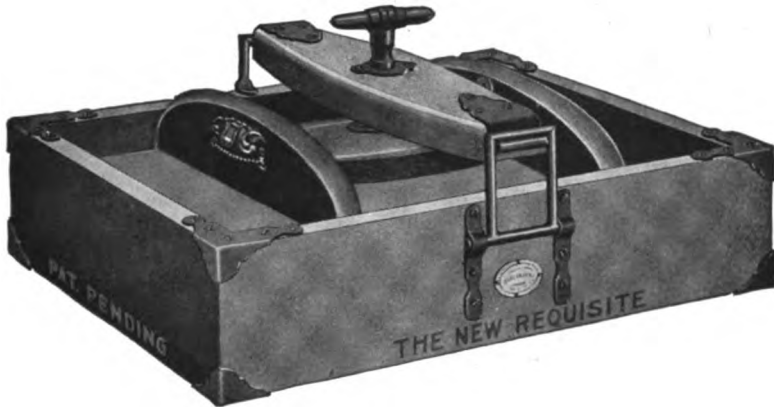
The Ostrander Seymour Co., Chicago, U. S. A.

Please note some of its strong points.

Being made on scientific principles it breaks no bottom glass from unequal pressure, even though the glass rocks in the Frame, provided the ledges are clean.

This surprising statement is possible because the Frame is not dove-tailed at the corners and therefore allows for expansion and contraction of wood under variations of temperature.

We have yet to hear of the first complaint of glass breaking on above account.



The "Perfected" is quickly and easily operated. No bothering with a lot of arms, latches and screws, no rubber springs with unequal pressure, no padding. Just turn down the central screw and there you have it, a sure and satisfactory contact.

Frames have the Rubberine instead of Felt facing on pressure board; this is a better equalizer than Felt or India Rubber.

It is the lightest Frame in use.

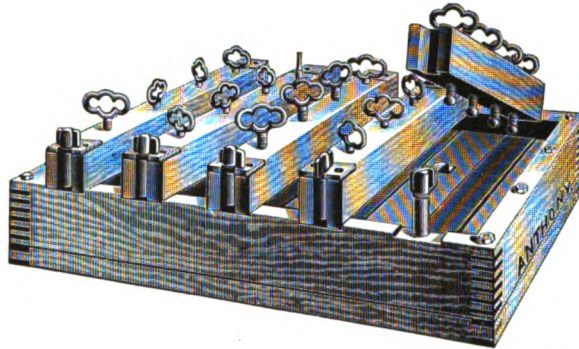
Will do any amount of hard work and last for years.

Size of Frame		Price without Glass	Price of Glass
8x10	One arm pressure,	\$10.00	\$ 2.25
10x12	" " "	12.25	2.75
11x14	" " "	13.75	3.50
12x16	" " "	15.50	4.25
13x19	" " "	17.50	5.50
14x17	" " "	17.00	5.25
16x20	" " "	19.75	7.00
18x22	" " "	22.00	8.75
18x24	" " "	23.00	9.50
20x24	" " "	24.25	10.50
20x30	" " "	27.50	13.25
21x25	" " "	25.25	11.50
22x28	" " "	27.50	13.50
24x36	Two arm pressure	33.00	19.00
30x40	" " "	41.75	26.50

The above are the sizes we aim to carry in stock, but we are prepared to make any size on short notice. Can also furnish you any size or thickness of glass promptly on receipt of order. Our glass is the best Polished Plate. Thirty days trial to responsible parties and satisfaction guaranteed.

ANTHONY'S PROCESS PRINTING FRAME.

An improvement over the old heavy Process Printing Frame, made of best material, with strong iron pressure screws, heavy top and iron strips for screw bearings, bolts extending through the woodwork, with

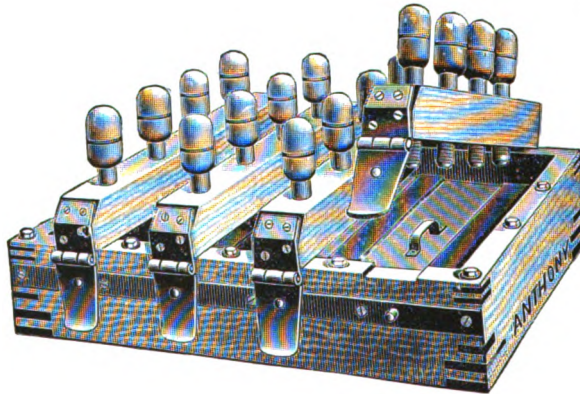


hinges and clutches as strong as iron can make them. This frame insures perfect distribution of pressure, and is to be depended upon in all particulars. Price, including one inch glass:

Size.	Price.	Size.	Price.
9x11.....	\$10.50.....	18x21.....	\$25.00
11x13.....	12.00.....	19x23.....	27.50
12x15.....	14.00.....	21x25.....	32.50
15x18.....	18.00.....	23x29.....	37.50
17x21.....	24.00.....		

NEW YORK PROCESS PRINTING FRAME.

With wooden pressure screws and iron strips for screw bearings, very strong and light. Bolts extend through woodwork and hinges, and clutches



are made with special reference to strength and durability. Price, including one inch glass:

Size.	Price.	Size.	Price.
9x11.....	\$10.50.....	18x21.....	\$25.00
11x13.....	12.00.....	19x23.....	27.50
12x15.....	14.00.....	21x25.....	32.50
15x18.....	18.00.....	23x29.....	37.50
17x21.....	24.00.....		

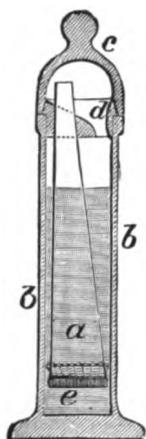


EFFECTIVE COLLODION BOTTLE.

A marked improvement in the plain collodion vial will be seen in the illustration. Many of these articles have not been provided with a good pouring lip, and have had no means for preventing the flowing of any possible sediment outward with the collodion or varnish. The curvature in the base retards the passage of that sediment, while the lip is so constructed that the liquid returns to the bottle and does not drop outwardly. The neck is widened to more readily admit the return of the solution to the bottle.

Can be effectually corked.

Eight_ounce size, price 40 cents each.



CROSS' FILTERING AND POURING BOTTLE.

This vial is most useful for filtering and pouring. Oftentimes collodion requires modification—it may be too thick or too thin, too old or too new, or the photographer may be desirous of combining two or more varieties, to meet a present requirement; and in all similar exigencies he has nothing to do but to fill the vial and go to work, for the process of filtration is constantly progressing. It is equally useful for varnishes.

The bottle is of the ordinary form, but of somewhat larger size; inside of this a graduated glass tube is inserted, from the top of which the collodion or varnish flows; and at the base one or more thicknesses of canton flannel serve for a filter that will last for months. The funnel-shaped orifice (d) receives the excess from the plate, and renders waste unnecessary. The cap covers both flowing and receiving orifices, and is easily removed. It is highly commended by many users.

Price..... \$3.50

PORCELAIN EVAPORATING DISHES.

These are the genuine imported; cheaper goods are on the market, but are not so reliable.

No.	Diam.	Containing	Price.	No.	Diam.	Containing	Price.
00	16	3 gals	\$5.00	4	10	3 pts	\$1.00
0	15	2 "	3.50	5	9	2 "	.85
1	13	1 "	2.10	6	8	24 oz	.75
2	12	3 qts	1.75	7	7	20 "	.65
3	11	2 "	1.30				

Glass Baths in Boxes.

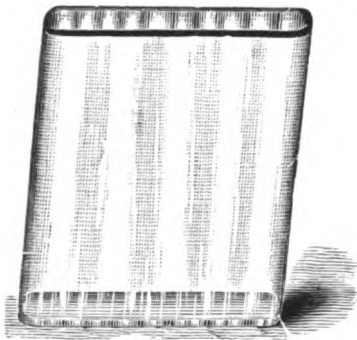


Fig. 1.

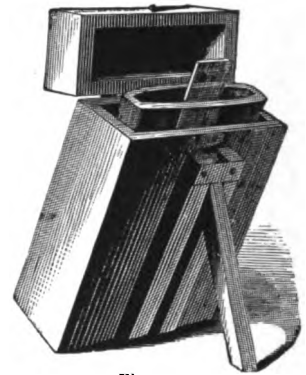


Fig. 2.

Without Box, Fig. 1.

Size.	For Plate.	Price.	Size.	For Plate.	Price.
5x 7	4½x 5½	\$ 0.90	15x20	14x17	\$15.00
7x10	6½x 8½	1.20	16x20	14x17	18.00
9x11	8 x10	1.80	18x22	17x20	27.00
11x14	10 x12	3.00	21x26	20x24	50.00
12x16	11 x14	6.00			

With Box, Fig. 2.

Size.	For Plate.	Price.	Size.	For Plate.	Price.
5x 7	4½x 5½	\$ 1.65	15x20	14x17	\$17.50
7x10	6½x 8½	2.10	16x20	14x17	20.50
9x11	8 x10	3.05	18x22	17x20	30.00
11x14	10 x12	4.25	21x26	20x24	54.00
12x16	11 x14	7.35			

HARD RUBBER DIPPERS.

No.	Size.	Price.	No.	Size.	Price.
4	5x 7	\$0.37	7	12x16	\$0.63
5	7x10	.42	8	14x18	.84
6	9x11	.47	9	17x20	1.05
6½	10x12	.53	10	19x24	1.52

AGATE EVAPORATING DISHES.



No.	Diam. in.	Capacity.	Price.
1	5	1 pt.	\$ 0.75
2	8	1 qt.	1.00
3	9	½ gal.	1.50
4	12	1 "	2.00
5	16	2 "	3.00
6	18	3 "	4.00
7	20	4 "	6.00
8	22	5 "	12.00
9	24	6 "	15.00

GLASS MORTARS AND PESTLES.

Size.	Price.	Size.	Price.
1 oz	\$0.15	8 oz	\$0.35
2 "	.20	16 "	.55
4 "	.25	32 "	.88

PORCELAIN MORTARS AND PESTLES.

Size.	Price.	Size.	Price.
2 in	\$0.40	5 in	\$1.00
2½ "	.45	5½ "	1.25
3 "	.50	7 "	1.75
4 "	.70	8 "	2.25

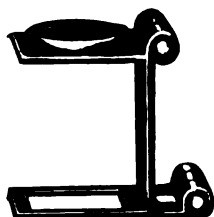
The Ostrander Seymour Co., Chicago, U. S. A.

HYDROMETERS.

For measuring the specific gravity or relative density of liquids. These Hydrometers are guaranteed to be accurate.

Single degree scale, packed in wooden cases, each.....\$ 0.50

MAGNIFYING GLASSES—LINEN TESTER.



These are very powerful, compact, and cheap magnifying glasses, and are very useful for counting the lines in screens and the dots in negatives and proofs.

	Brass Lacquered.	Nickeled.
$\frac{1}{4}$ inch Aperture, each.....	\$0.35	\$0.65
$\frac{1}{2}$ " " ".....	.40	.70
1 " " ".....	2.60	3.30

ENGRAVER'S EYE GLASS.

Rubber Frame.

Assorted foci from 2 to 4 inches.

Price, each\$0.35



DOUBLE PLANO-CONVEX LENSES.

$1\frac{1}{2}$ inches diameter, each.....	\$1.40
$1\frac{3}{4}$ " " ".....	1.65
$1\frac{7}{8}$ " " ".....	2.00
2 " " ".....	2.50

EYE GLASS STANDS.

Each\$3.00

LENS SUPPORT.

The most practical device as yet invented for this purpose. The bed plate is screwed to the side of the retouching frame. The lens can readily be adjusted to and held firmly in any conceivable position by the universal ball clamp employed. Made of brass, nickel-plate finish. Price does not include the retouching glass.

Price, each\$1.50





IMPROVED RETOUCHING FRAME.

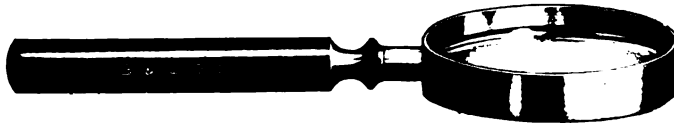
This retouching frame will be found useful in many ways, such as cutting negatives, painting out, etc.

PRICES.

8x10 inches and under	\$3.00
11x14 " " " "	6.00

GIHON'S OPAQUE.

Opaque (Gihon's), per box	\$0.50
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REDUCING GLASSES.

No. A70, 2 inches diam . . . \$1.50	No. A73, 3½ inches diam . . . \$3.00
No. A71, 2½ inches diam . . . 2.00	No. A74, 4 inches diam . . . 4.00
No. A72, 3 inches diam . . . 2.50	No. A75, 5 inches diam . . . 6.00

READING GLASSES.

No. A80, 2 inches diam . . . \$0.80	No. A87, 3½ inches diam . . . \$2.00
No. A81, 2½ inches diam90	No. A88, 3¾ inches diam . . . 2.25
No. A82, 2¾ inches diam . . . 1.00	No. A89, 4 inches diam . . . 2.50
No. A83, 2¾ inches diam . . . 1.25	No. A90, 4½ inches diam . . . 3.25
No. A84, 3 inches diam . . . 1.50	No. A91, 5 inches diam . . . 3.75
No. A86, 3½ inches diam . . . 1.75	

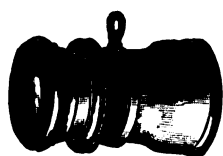


THE NEW DUPLEX FOCUSING GLASS.

Cheap and Good.

Price, each	\$1.25
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The Ostrander Seymour Co., Chicago, U. S. A.



E. A. COMPOUND FOCUSING GLASS.

For fine work the E. A. Compound Focusing Glass is the best. It has a double compound lens.

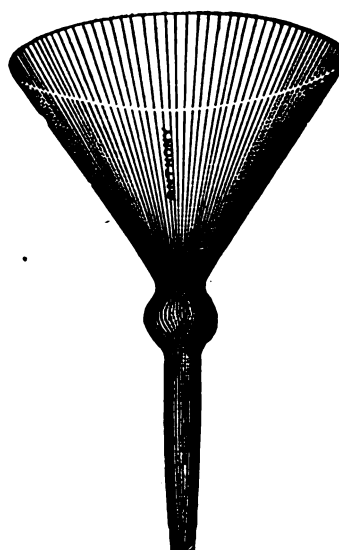
Price, each\$2.50

Anthony's Combined Bulb Funnel and Filter.

In this combination of funnel and filter, the bulb retains the filtering cotton in such a manner as to obviate the difficulty experienced in the ordinary funnel, caused by the cotton being compressed too tightly.

The sizes and prices are as follows:

Half pint	\$0.35
Pint	.40
Quart	.50
Half gallon	1.00



THE PATENT FLUTED FUNNEL.

These are the best glass funnels made. They are very strong; are made in molds; have solid glass ribs on the inside, running vertically, as shown in the cut, thus forming passages through which the solution descends freely after passing through the paper, and accomplishing the filtration in a fraction of the time heretofore required. Another advantage of this funnel, is the outside of the neck is fluted, and the lower end beveled, so as to provide for the escape of air and to prevent overflowing.



Quarter pint	\$0.15
Half pint	.15
Pint	.20
Quart	.30
Two quarts	.45

PLAIN GLASS FUNNELS.

Quarter pint	\$0.15	Two quarts	\$0.40
Half pint	.15	Gallon	.75
Pint	.20	Two gallons	1.25
Quart	.25		

HARD RUBBER FUNNELS.

No. 0. Quarter pint	\$0.40	No. 2. Pint	\$0.55
No. 1. Half pint	.50	No. 3. Quart	.60

TUMBLER GRADUATE.

Is a low priced graduate of excellent make and material. It is manufactured in three sizes only, as noted below. Its figures are in relief on the surface.

2 ounces	\$0.08
4 "	.10
8 "	.20
16 "	.35

CLIMAX GRADUATES.

The measuring lines of this graduate are sunk into the glass and the figures are raised, thus permitting of easy reading, even in the dark room.

1 ounce	\$0.15
2 "	.16
4 "	.20
8 "	.30
16 "	.40



ANTHONY'S MOLDED GRADUATES.

The Molded Graduates are of uniform size and accurate markings, differing in this particular from many of those ordinarily sold which are of blown glass, and, being registered according to a given rule, the least variation in form or thickness of the graduate renders the marking inaccurate. Made in the following sizes:

Warranted Accurate.

Minim	\$0.25	6 ounce	\$0.35
2 dram	.25	8 "	.45
1/2 ounce	.17	12 "	.55
1 "	.17	16 "	.65
2 "	.20	24 "	.80
3 "	.25	32 "	1.15
4 "	.30	64 "	4.00

IDEAL BALANCE SCALE.

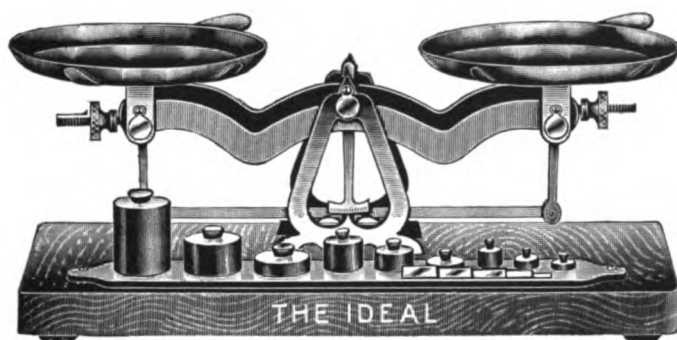
In the manufacture of the Ideal Balance Scale we have aimed to place before the photographic fraternity a weighing apparatus which would have all the essential features of a high grade drug scale, and at a price low enough to be within the reach of all amateur or professional photographers.

The Ideal Scale is gotten up on lines of the highest grade, and is vastly superior to any scale now on the photographic market. It is finely adjusted, and the friction of all its bearings is so evenly distributed that we

The Ostrander Seymour Co., Chicago, U. S. A.

can guarantee this scale to be sensitive to, and to weigh correctly, one half grain and up.

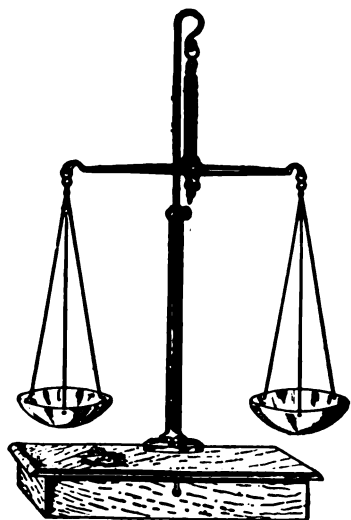
We have introduced several new features which are sure to be appreciated by the user, including interchangeable and removable pans and adjusting screws. With these screws a perfect balance is assured at all times. The index gauge is of the best form and makes accurate adjustment and correct weighing easy.



The weights we supply with this scale we guarantee perfectly accurate, each one being adjusted to a perfect standard. Each weight is held in an opening sunk in a brass plate attached to the base, making their arrangement the most convenient. Metric weights supplied, instead of grains and ounces, when so ordered.

All the metal work on the scale, including the weights, is handsomely nickel-plated and polished; the base is of quarter-sawed oak, highly polished, making it the prettiest scale on the photographic market.

Price, complete with weights from $\frac{1}{2}$ grain to 2 ounces \$ 4.00

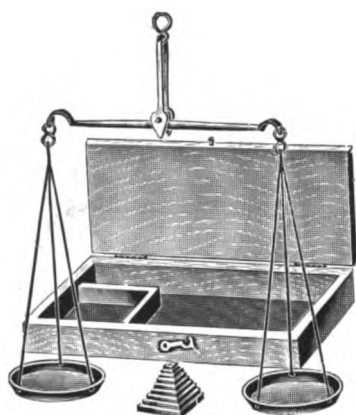


INGENTO PHOTO SCALES.

These scales are sensitive and accurate. They can be taken apart when not in use, and packed in the box upon which they stand. They are made of brass, with steel bearings. The price includes a full set of weights.

PRICE.

6-inch beam	\$ 2.00
8-inch beam	3.00

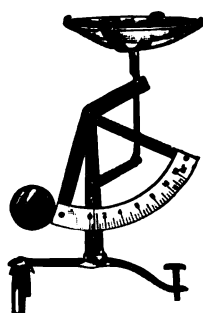


HAND BALANCES.

These balances are perfectly reliable. They weigh from $\frac{1}{2}$ ounce to $\frac{1}{2}$ grain. Each scale is packed in a box with full set of weights. They are well adapted for amateur photographers.

PRICE.

5-inch beam	\$ 0.75
6-inch beam	1.00
8-inch beam	2.50



ALADDIN AUTOMATIC SCALES.

These scales are very accurate and always ready for use, as no weights are required. The pan is detachable and the arms that hold it as well as the legs fold together, so that the scale can be packed in a small flat box. They are made of brass, polished and lacquered.

No. 1. Weighs up to 12 drachms, with glass pan	\$ 1.25
No. 1A Weighs up to 50 grammes, with glass pan	1.25
No. 2 Weighs up to 18 ounces, with brass pan	2.50

APOTHECARY AND METRIC WEIGHTS.

These weights are the same as are supplied with the Ideal Balance Scale. They are made of brass and are guaranteed perfectly accurate. The apothecary weights, numbering fourteen, range serially from 2 ounces down to $\frac{1}{2}$ grain. The 2 ounce, 1 ounce and $\frac{1}{2}$ ounce weights are avoirdupois, while all the lesser weights are apothecary.

The Metric Weights, numbering ten, range serially from 50 grams down to 5 centigrams.

Price, per set, either system	\$ 1.00
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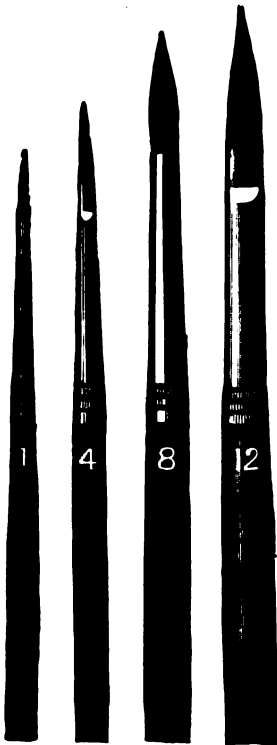
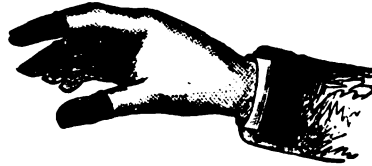
The Ostrander Seymour Co., Chicago, U. S. A.

PURE RUBBER FINGER TIPS.

Specially made for Photo use. A Perfect protection and relief for the Fingers.

They do not impair the sense of touch.
Easily applied or removed.

Per set of three.....\$ 0.15
Per dozen sets..... 1.50



RED SABLE PENCILS—FIRST QUALITY.

Size. Nos.	Price per Dozen.	Price Each.
1 to 6	\$1.00	\$0.10
7 to 12	1.25	.12

BRISTLE BRUSHES.

These brushes are well made, of selected bristles, are strongly bound in tin, and will be found thoroughly reliable.

Size.	Price per Dozen.	Price Each.
1 in	\$1.20	\$0.12
1½ "	1.80	.20
2 "	2.40	.25
2½ "	3.00	.30
3 "	3.60	.40

HARD RUBBER SET AND BOUND PHOTOGRAPHERS' BRUSHES.



The bristles of these brushes are secured to the handle by first immersing the butts, or stiff ends, in soft rubber; they are then put upon the end of the handle—not around it, as in the old way; a belt of rubber combined with metal is wound around the whole, covering the butt of the bristles, and conforming to a groove running around the adjoining end of the handle. The portion of the brush covered with rubber and metal is then placed in a die and vulcanized, or hardened, under heat and pressure. The result is a solid vulcanized head, in which the bristles are so thoroughly imbedded that it is impossible for them to get loose, no matter in



Catalogue and Treatise on Photo-Engraving.

what solution they may be used. The handle being dovetailed into the head (see sectional illustration) is also firmly secured. In addition to superior mode of manufacture these brushes contain more and better bristles than the ordinary kind.

Width.			Each.
1 inch.	Camel's Hair	.....	\$0.38
1½ "	" "	.....	.57
2 "	" "	.....	.85
2½ "	" "	.....	1.10
3 "	" "	.....	1.50

Width.			Each.
1 inch.	Bristle, paste	.....	\$0.20
1½ "	" "	.....	.25
2 "	" "	.....	.35
2½ "	" "	.....	.45
3 "	" "	.....	.50
4 "	" "	.....	.85

CAMEL'S HAIR DUSTERS.

Strongly bound in tin, and very well made.

Width.		Each	Per Doz.
1 in	.....	\$0.20	\$2.25
1½ ins	.....	.30	3.45
2 ins	.....	.45	5.00
2½ ins	.....	.65	7.40
3 ins	.....	.80	9.25

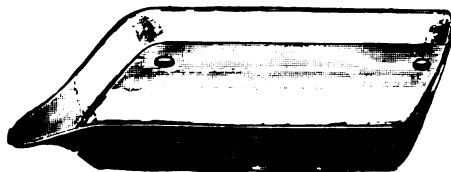
POWDERING BRUSHES.

	Each
Camel's Hair, Heavy, 2 ins.....	\$0.65
The Same, 2½ ins.....	.80
Fitch's Hair, Heavy, 2 ins.....	.65
The Same, 2½ ins.....	.80

EXTRA THICK CAMEL'S HAIR POWDERING BRUSH.

5 ins. wide, ¾ ins. thick, each.....	\$4.35
6 ins. wide, ¾ ins. thick, each.....	5.25
7 ins. wide, ¾ ins. thick, each.....	6.45

ELITE PORCELAIN LINED TRAYS.



These trays have been introduced to meet the demand for a strong tray with a fine surface, such as porcelain, that can be readily kept clean, yet not be so fragile as the porcelain trays, and at the same time less

The Ostrander Seymour Co., Chicago, U. S. A.

expensive. These trays will fulfill the above requirements, and are proof against any acids used in the photographic business.

In ordering please state number.

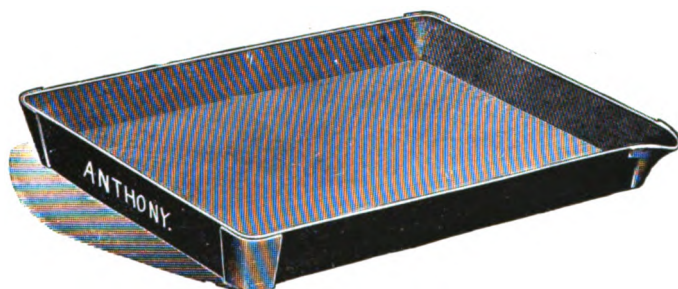
PRICES.

No.		For Plate.	Inches deep.	Each.
1—	4½ x 5½	4 x 5	1½	\$0.25
2—	5½ x 7½	5 x 7	1½	.50
3—	5½ x 8½	5 x 8	1½	.63
4—	7½ x 9½	7 x 9	1½	.75
5—	8½ x 10½	8 x 10	1½	1.13
6—	10½ x 12½	10 x 12	2	1.70
7—	12½ x 15½	11 x 14	2½	2.25
8—	13½ x 17½	12 x 16	2½	2.63
9—	15 x 17½	14 x 17	2½	3.75
10—	17 x 21	16 x 20	2½	4.50
11—	19 x 23	18 x 22	2½	6.00
12—	21 x 25	20 x 24	3	7.00
13—	23 x 28	22 x 27	3½	9.00

ARGO TRAYS.

3½ x 4½	\$0.12	5 x 7	\$0.35	6½ x 8½	\$0.70
4 x 5	.17	5 x 8	.39	8 x 10	.95

HARD RUBBER TRAYS.



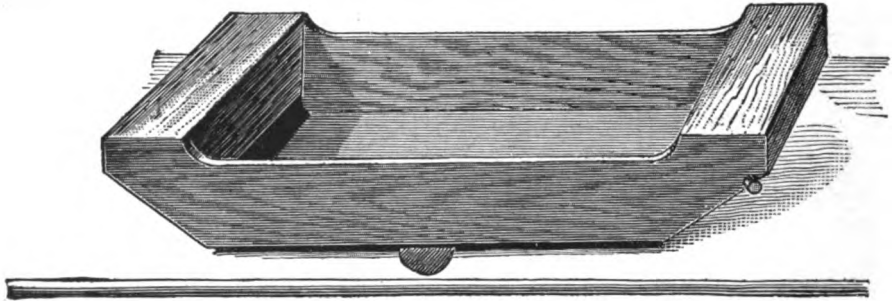
These goods, manufactured of genuine hard rubber, have been long and favorably known to the profession, and met with universal approval.

Size.	Price.
4½ x 5½	\$0.60
5½ x 7½	.75
5½ x 8½	.86
7 x 9	1.05
8½ x 10½	1.35
10½ x 12½	2.00
12 x 16	3.10
15 x 19	5.20
18 x 22	6.60
19 x 24	7.40
21 x 26	9.35

Catalogue and Treatise on Photo-Engraving.

ETCHING TUB.

Constructed on a principle found to give the most satisfaction to professional etchers. Is provided with a new arrangement which prevents the acid solution from splashing in the operator's face.



20x30 inches	\$8.00
24x45 inches	9.50

We furnish steam attachments, stands, drain troughs, etc. Prices on application.

WHIRLER.

For coating copper or zinc plates with sensitizing solution.

Price, each	\$1.00
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HAND REST.

Useful as a support to the hand while touching up prints on zinc.

Price, 18 inches, each	\$0.50
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EGG BEATER.

Used for beating the albumen when making zinc sensitizing solution.

Price, each	\$0.25
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BOWL.

Price, each	\$0.25
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ROSE TAP.

To be attached to the faucet with rubber tubing. For throwing a spray when washing out and developing print in half-tone enamel process.

Price, each	\$0.50
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INK SPATULAS.

7-inch, each	\$0.80
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ENGRAVERS' PADS.

4 inch, Filled	\$0.75
5 " "	1.00
6 " "	1.25
7 " "	1.50
8 " "	2.00
9 " "	2.25

The Ostrander Seymour Co., Chicago, U. S. A.

MATting PUNCHES.

For lowering and blending the edges of half-tones.

Price, each\$0.50

NAIL PUNCHES AND SETS.

Per pair\$1.00

TYPE-HIGH GAUGE.

This useful tool should be in every shop.

Price, each\$1.25

SOLDERING COPPERS.

For soldering injured parts of plate, etc.

Price, each\$0.50

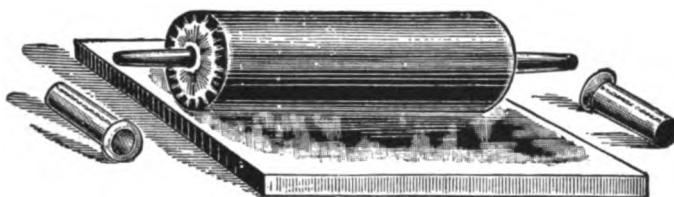
SOLDER.

Specially prepared for zinc.

Per pound\$0.30

LITHOGRAPHIC HAND ROLLERS.

For Rolling up or Coating Zinc Plate.



12 inch, prepared, French, each\$7.50

12 inch, unprepared, French, each 6.00

Roller cases, each 1.75

INKING SLABS.

15x15 inches, each\$2.25

15x18 inches, each 2.50

COMPOSITION ROLLERS.

Cast ready for use. Adapted for inking cuts when proofing; also used by some in inking the sensitive zinc plate after exposure, as a heavier coating can be applied than with a lithographic roller.

6 inches long, with one handle, etchers composition, each\$2.50

12 inches long, with two handles, etchers composition, each 4.50

WIDE NOSE PLIERS.

For handling zinc when heating.

6 inches, wide nose, each\$1.25

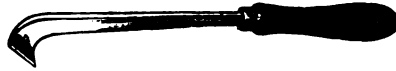
CALIPERS.

Price, each\$2.00

HAND VISES.

Price, each\$1.25

ZINC HOOK.



With this Zinc Hook a sheet of zinc can be cut with little effort, leaving a smoother edge than when cut with a saw.

Price, each\$1.25

MOUNTING SCREWS AND NAILS.

Screws, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ inch lengths, per gross\$0.30
Nails, per pound25

OIL STONES. Best for Gravers.

Price, each\$.50



ACID PITCHER.

By using this pitcher acids are handled safely.
It has a long lip and a side grip.

Acid Pitcher, 1 gallon, each 1.00
The Same, 2 gallons, each 1.50

Etching Powders. DRAGON'S BLOOD.

Our Etching Powders are positively the best the market affords. They form a stronger acid resist than other brands, melting smooth, without pinholes, and will not burn in brittle.

	1 lb. Can per lb.	5 lb. Can per lb.	25 lb Can per lb.
No. X, Dark Red	\$1.10	\$1.00	\$0.90
No. 1, Dark Red	1.85	1.75	1.65
No. 2, Dark Red	1.35	1.25	1.15
No. 3, Pink	.75	.65	.55
No. A, Red ..	.85	.75	.65
White Etching Powder, 1 lb. can.....			\$1.35
Russell Powder, 1 lb. can.....			1.75

ANTHONY'S XXX POWDER.

This is a special preparation used by applying to the plate after the first powdering. It saves time, prevents spreading of the lines, saves one powdering, and makes a top in connection with Anthony's Special that cannot be excelled.

Per pound.....\$0.75

The Ostrander Seymour Co., Chicago, U. S. A.

ZINC ETCHING FLUID.

Prepared for etching zinc. Etches cleaner and faster than nitric acid.

7 lb. g. s. b.	\$0.85
Carboys (carboys \$1.50 extra), per lb.	.05

ETCHING POWDER BOXES.

It is absolutely essential that the etching powder is kept free from foreign matter. These boxes are specially designed for that purpose.

PRICE.

18x18 inches, each	\$2.00
24x24 inches, each	3.00

HALF TONE DEVELOPING POWDER.

Will be found to help the inexperienced when developing half-tone prints on copper. By its addition to the water, it enables the operator to easily determine when the plate is developed.

4 oz.	\$0.75
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ETCHING INK.

This Ink is made expressly by us for rolling up the zinc plate after exposure. It has exceptional acid resisting power, which makes etching inks desirable.

$\frac{1}{4}$ lb. cans, each	\$1.75
$\frac{1}{2}$ lb. cans, each	3.00
1 lb. cans, each	5.00

PROOF INK.

Prepared expressly for making fine line and half-tone proofs on coated paper.

No. 1.

1 lb. can	\$5.00
$\frac{1}{4}$ lb. can	1.35

No. 2.

1 lb. can	\$2.00
$\frac{1}{4}$ lb. can	.60

STRIPPING COLLODION.

1 pint bottle, each	\$0.75
$\frac{1}{2}$ gallon can, each	2.75
1 gallon can, each	5.00

RUBBER STRIPPING SOLUTION.

This Solution is made from a well-tested formula, having been used for years by professional process workers.

1 pint bottle, each	\$0.40
$\frac{1}{2}$ gallon can, each	.95
1 gallon can, each	1.40

RUBBER CEMENT.

Is a liquid rubber, the consistence of molasses, used for stripping films. Can be diluted over one-half with benzole or naptha, making it by far the cheapest and best rubber solution on the market.

PRICE.

$\frac{1}{2}$ pint can	\$0.30
Pint can	.60
Quart can	1.20

Catalogue and Treatise on Photo-Engraving.

LE PAGE'S FISH GLUE

Is undoubtedly the standard of excellence, and that its superiority is known is attested by its largely increasing sales.

New Style Patent Cans.

Half pints, each	\$0.30
Pints, each	.50
Quarts, each	.90
Gallons, each	2.50

CLARIFIED FISH GLUE.

This Glue is prepared expressly for making half-tone solution, and will be found to give better results than the ordinary liquid glue. Being put up in glass bottles it is not affected by corrosion, as is the case with the tin packages. A well-recommended formula accompanies each bottle.

PRICE.

1 pint	\$1.00
1 quart	1.65

In ordering be sure to specify Clarified.

COPPERING SOLUTION.

For Copper-Facing Zinc Plates without a Battery.

This preparation is not designed to protect zinc cuts against wear, merely as a protection against oxidation.

Price, 1 pint bottle	\$0.75
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CHARCOAL.

The engraver's charcoal handled by us is of the best, being made by a manufacturer of ten years' experience.

	Size of Block.	Per lb.	For use on
No. XX	3 x6	\$2.75	Copper
No. 1	1½x6	2.50	Copper
No. 2	2½x3½	1.75	Zinc
No. 3	3 x4½	2.00	Zinc

POLISHING MATERIALS.

Emery Flour, per lb	\$0.15
Pumice Stone, lump, per lb	.15
Rotten Stone, powdered, per lb	.20
Rouge, nickel platers, per lb	.60
*Scotch Stone, irregular pieces, per lb	.15
*Scotch Stone, sawed into cubes, 6 to 8 inches long by 1½ or 2½ inches square, per lb	.30
Whiting, per lb	.10

*Our Scotch Stone is the best grade Scotch Hone.

POLISHED HARD ZINC PLATES—Market Prices.

15x36 ins., 14 Gauge	17x22 ins., 14 Gauge
15x36 ins., 16 Gauge	17x22 ins., 16 Gauge
22x28 ins., 14 Gauge	14x17 ins., 14 Gauge
22x28 ins., 16 Gauge	14x17 ins., 16 Gauge
18x36 ins., 14 Gauge	10x12 ins., 14 Gauge
18x36 ins., 16 Gauge	10x12 ins., 16 Gauge

The Ostrander Seymour Co., Chicago, U. S. A.

POLISHED COPPER PLATES—Market Prices.

15x36 ins., 16 Gauge.....	22x28 ins., 16 Gauge
15x36 ins., 18 Gauge.....	22x28 ins., 18 Gauge
16x24 ins., 16 Gauge.....	12x15 ins., 16 Gauge
16x24 ins., 18 Gauge.....	12x15 ins., 18 Gauge
20x24 ins., 16 Gauge.....	10x12 ins., 16 Gauge
20x24 ins., 18 Gauge.....	10x12 ins., 18 Gauge

HEAVY PLATE GLASS.

For Printing Frames. Perfectly clear and strong, without flaws or scratches.

8x10, one inch thick, each	\$2.30	17x20, one inch thick, each...	\$ 8.75
10x12, " " " "	3.00	18x22, " " " " ...	9.75
11x14, " " " "	4.00	20x24, " " " " ...	12.00
14x17; " " " "	6.00		

PLATE GLASS.

For Negative Supports, when printing on zinc or copper in printing frame. It is perfectly flat, finely polished, and about $\frac{1}{4}$ inch thick.

8x10, each.....	\$0.38	16x20, each ..	\$1.70
10x12, each.....	.56	18x22, each ..	2.24
11x14, each.....	.78	20x24, each ..	2.70
14x17, each.....	1.20		

CRYSTAL PLATE GLASS.

This glass, for half-tone negatives, is unequaled. It is about $\frac{1}{8}$ inch thick, perfectly polished and flat.

8x10, each.....	\$0.34	16x20 each,.....	\$1.76
10x12, each.....	.48	18x22, each ..	2.00
11x14, each.....	.72	20x24, each ..	2.68
14x17, each.....	1.08		

NEGATIVE GLASS.

French.

	No. of Lights Per Box.	Per Doz.	Per Box.
8x10 inches ..	90	\$ 1.56	\$ 9.70
10x12 " ..	60	2.34	9.70
11x14 " ..	47	3.96	11.70
14x17 " ..	31	5.94	11.70
16x20 " ..	23	8.44	11.70
18x22 " ..	18	12 12	15 10
20x24 " ..	15	14.52	15.10

Catalogue and Treatise on Photo-Engraving.

English, 16 and 26 Ounce.
Perfectly flat, without waves. Inferior only to Plate.

	No. of Lights per Box.	Per doz.	16 oz.	26 oz.
8x10 inches	90		\$ 1.60	\$ 2.20
10x12 "	60	"	2.40	3.24
11x14 "	47	"	3.72	4.72
14x17 "	31	"	5.94	7.14
16x20 "	23	"	8.70	11.08
18x22 "	18	"	12.36	13.48
20x24 "	15	"	14.80	16.20

CRYSTAL PLATE GROUND GLASS.

	Ground.	1½ inch Clear Circle in Center.
8x10	\$2.00	\$2.25
10x12	2.20	2.50
11x14	2.40	2.80
14x17	3.80	4.20
17x20	4.50	5.00
18x22	5.20	5.60
20x24	6.30	6.70

SPECIAL DIAPHRAGM.

We are prepared, at all times to make diaphragms of special shape.
suitable for obtaining various effects in half tone negatives.

ACID TUBS.

For Soaking Negative Glass Preparatory for Cleaning.

Stoneware, heat and acid proof, 24 in. wide, 26 in. long, 16 in. deep, each	\$30.00
Glass, 3 gallon, 6 x11 x11 in.	2.50
Glass, 10 gallon, 12½x14 x15 in.	7.00
Glass, 18 gallon, 14 x16½x21 in.	9.00
Glass, 20 gallon, 15½x30 x12 in.	10.00

PROVING PLATES FOR PHOTO-ENGRAVERS' PROOF PRESSES.

Made of cast iron, planed true on all surfaces and filed on one side.

No.	Inches.	Price.
1	14x18	\$ 9.50
2	16x21	11.50
3	20x25	15.50
4	22x30	19.00
4½	23x35	24.50
5	25x30	28.50
5½	26x40	31.50
6	28x43	36.50
7	31x47	40.00

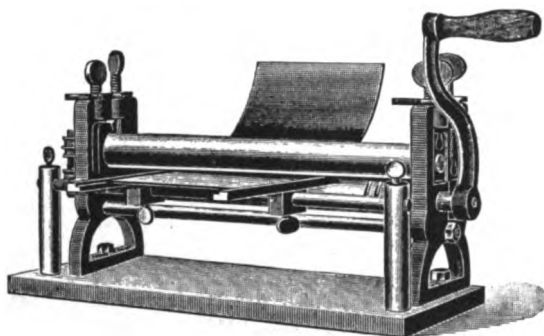
The Ostrander Seymour Co., Chicago, U. S. A.

Rockford Air Brush



Plain complete.	\$30.00
Air Brush, hand piece only.....	26.50
Pump and Reservoir only.....	5.00
Easel	5.00
Air Brush, complete with easel.....	35.00

Plate Bending Machine



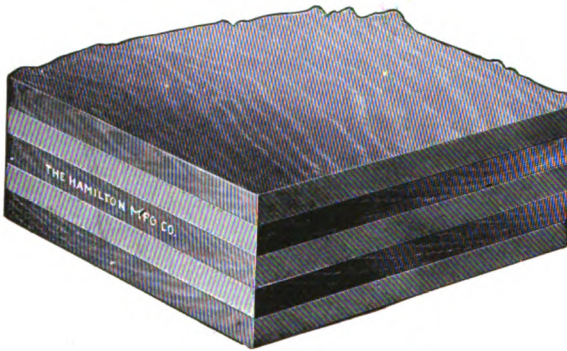
For curving zinc or copper plates intended for insertion in the stereotype matrix where printing is done direct from the original on rotary presses.

Wood Backing

LAMINATED BACKING WOOD.

The New Mounting Lumber.

This mounting lumber has recently been placed on the market by us, and it has met with unprecedented success. Engravers have at once perceived its excellent qualities and its superiority for large plates. Being constructed of several layers of wood, in which the grain is crossed alternately, it cannot shrink, swell or crack. An important feature of this back-



Laminated Mounting Wood.

ing wood is its ability to withstand a long and heavy run under a large plate, without giving way in the center and showing a light print. This has been thoroughly demonstrated by exhaustive experiments. We furnish this backing in standard thicknesses of $\frac{3}{8}$ or $\frac{1}{2}$ inches, or we will plane to a sample.

plate so that cuts will be type high when mounted without further dressing. The price is 25 cents per foot, net. Lots of 100 feet are delivered f. o. b. at \$25.00. Furnished in blocks any size desired. Standard sizes are 12x24, 16x24, 24x36, 24x24. Thirty inches the narrow way is the largest size we make.

BIRCH AND CHERRY BACKING WOODS.

Made from well-selected stock, free from all imperfections, planed $\frac{7}{8}$ inch in thickness or thinner, at regular price. Put up in packages of 100 square feet in assorted widths from 3 to 10 inches wide. Special widths and heavier thicknesses can be furnished at special prices. The unprecedented success of our popular Birch Backing wood is most gratifying. It is the cheapest backing wood ever put on the market, and at the same time it is one of the best. Some of the most extensive establishments are using this wood exclusively on all regular work, to the satisfaction of themselves and their customers. For all ordinary work we fully guarantee it equal to the best cherry wood.

Price, Birch Backing, per 100 feet, f. o. b. \$ 8.00

Price, Cherry Backing, per 100 feet, f. o. b. 15.00

HOW TO HANDLE BACKING LUMBER.

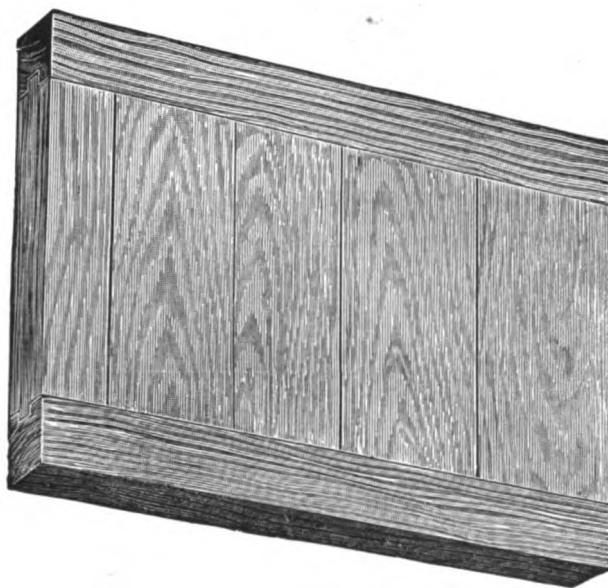
Customers sometimes write us and complain that their Backing Wood has warped and ask us if it is not due to the wood being improperly seasoned. We have found that such warping is almost invariably due to the way the wood is handled after receipt by the customer. The wood being unfinished and the pores open it readily absorbs moisture and if exposed to the atmosphere on one side only the wood will surely warp, no matter what kind of wood it is or what the construction may be. Backing Lumber should, therefore, be kept in the original cases, covered with paper or other material, with a weight on top, or it can be kept in racks on edge, with a free circulation of air all around each piece. When handled this way there is very little likelihood of the wood warping. If a piece of wood is laid on a flat surface, with one side exposed, it will invariably warp.

PANELED BACKING.

For large plates and in book work where a number of uniform boards are required that are too large to mount on the ordinary uncleated backing owing to the liability of warping, we recommend this improved cleated backing. It is made of clear selected stock, free from all imperfections of any kind. The workmanship is first-class and it is strictly a high-grade backing wood.

A good plate is worth a good mount. The few cents that a good mount costs over the price of a poor one cuts little figure in comparison to the satisfaction derived from sending out good mounts or the customer's satisfaction in the use of them.

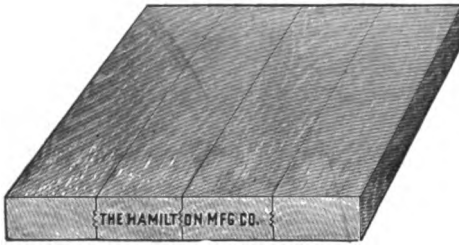
We make these paneled blocks in 2-foot lengths and put them up in any width desired. We usually have them ordered with half-inch variations. This is a perfect backing for large cuts.



Paneled Mounting Wood.

Price, per square foot,.....	\$ 0.25
Lots of 100 feet, f. o. b.	\$25.00

GLUED-UP BACKING.



Glued-Up Wood.

This is a new wood which we have recently introduced and it is giving great satisfaction, especially where extra wide boards are wanted. It is made up of strips about 3 inches wide, joined by a double V-shaped groove. It is furnished in varying widths and two-foot lengths.

Price, per 100 feet, f. o. b. \$ 9.00

HOW TO ORDER BACKING LUMBER.

The standard thickness is $\frac{7}{8}$ inch, and this thickness will allow final dressing off the back after plates are mounted. Most of our customers who have Daniels' planers order their backing this thickness. If a small piece of plate is sent us we will plane the lumber so that the plates will be type high when mounted without further dressing. Many of our customers find this the most desirable and economical method.

If interested in Electrotyping or Stereotyping send for special catalogue bearing on the subject.



The Ostrander Seymour Company
CHICAGO, U. S. A.

What you can get from any house you
can get from

THE OSTRANDER SEYMOUR CO.



You can get from

THE OSTRANDER SEYMOUR CO.

What you cannot get from any
other house



If you have not found what you want
in this catalogue *write* and let us know
your needs. If the goods are to be had
we will get them for you at *satisfactory*
prices and ship them with all possible
dispatch



EVERYTHING
FOR THE
Photo-Engraver



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